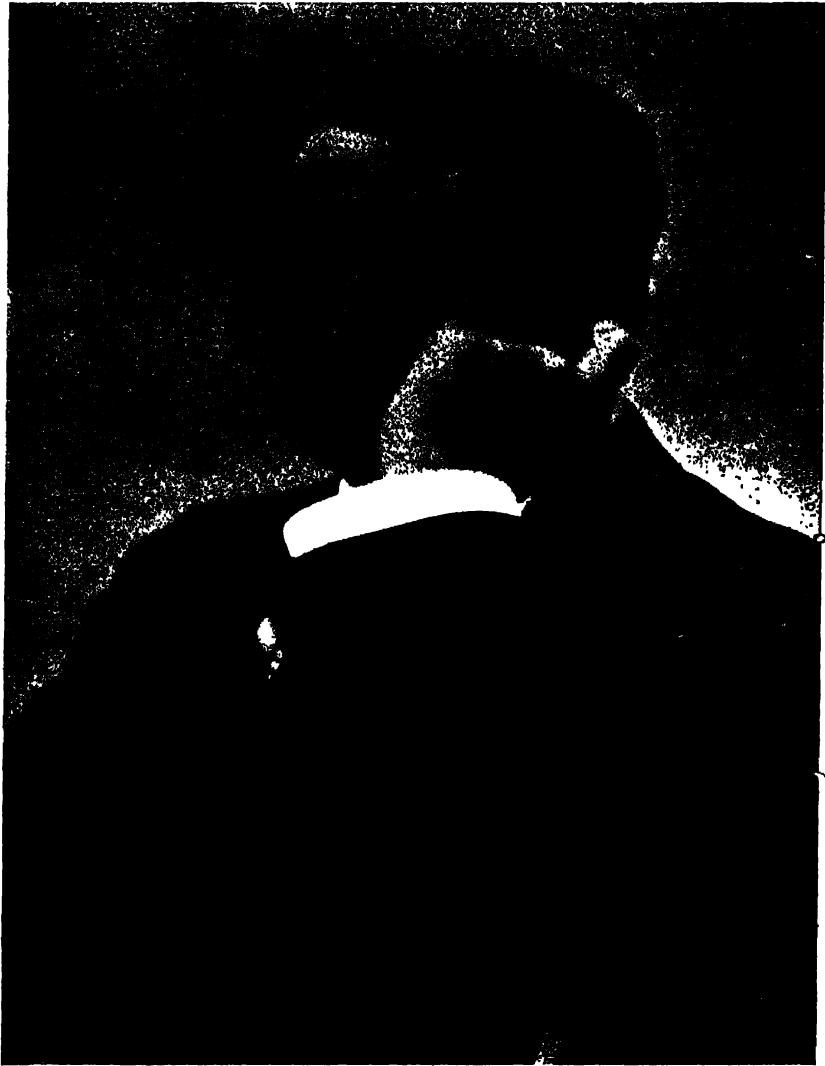


**HARMSWORTH BUSINESS
LIBRARY VOLUME I**



LORD NORTHCLEFFE, who writes on 'Personality in Business'

ASPECTS OF BUSINESS

BY LORD NORTHCLIFFE, LORD
FURNESS, SIR HAROLD
HARMSWORTH, BART., SIR
T. VEZEY STRONG, SIR
HIRAM MAXIM AND OTHERS

FACTORY ORGANISATION AND MANAGEMENT

BY J. W. STANNARD

WITH NUMEROUS PORTRAITS
PLANS, CHARTS, AND
FACSIMILE DOCUMENTS



LONDON
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1881

THE Harmsworth Business Library has been designed to meet the need for an authoritative work of reference and practical advice on every aspect of commercial life. It has been planned on large lines of suggestiveness and utility, hitherto not attempted.

The Library is no mere collection of miscellaneous articles; it is a comprehensive original work, written and edited with a single eye to promoting the interests of British business. The volumes are interdependent, and the absence of one would make the Library incomplete, yet each is in itself an adequate treatment of the subject to which it is devoted.

The general principles on which the work has been produced were the outcome of much careful consideration by an Editorial Board of business experts, and no expense has been spared to secure the most expert contributors on every subject that comes within its scope. Some of the most successful business men of to-day have personally contributed chapters containing invaluable information, the fruit of their own business knowledge.

Even the least item in the work has come from the pen of some one of practical experience, and included among the long roll of contributors are many actively engaged to-day in the various departments of manufacturing or selling, who have been induced to co-operate with a view to making the Library so wide in its scope that no business man can have interests which are neglected, and yet so remarkable in detail as to abolish the need for numerous handbooks.

As each section carries a special editorial introduction, it is not necessary to enter here into a detailed description of the whole, but in support of what has been claimed above, it may be pointed out that the section

dealing with Factory Organisation and Management provides the British reader for the first time with a well-ordered mass of information and illustrative documents of immense value to all engaged in the processes of manufacture; while the second volume contains the pith and marrow of numerous textbooks on Office Organisation and the selling end of business; and Volumes III. and IV. present the reader for the first time with works that stand alone in the literature of commerce, on Importing and Exporting.

Volume V., devoted to Advertising and Publicity, is likely to rank for many years as the standard treatise on its subjects; while the Encyclopædia of Retail Trading, contained in Volumes VI. and VII., provides a vast amount of highly specialised information; and the eighth volume of the Library, devoted to the Financial side of business, is worthy to stand as an independent work of the most distinctive character.

The two exhaustive volumes on Commercial Law (IX. and X.) have been prepared at great cost by a group of legal experts, and form in themselves an encyclopædia which might have been published independently at the price of the whole Library. Sir Francis Palmer's treatise on Company Law, expressly written for it, is of itself sufficient to confer distinction on any work.

But the Editorial Board have no wish to canvass the merits of the Harmsworth Business Library and prefer that these should speak for themselves. It need only be added that, in order to disturb the reader as little as possible with cross-references from volume to

*volume, a minimum of these have been inserted,
and a full and carefully compiled index is
printed at the end of the last volume,
by means of which ready reference
can be made to the contents
of the whole.*

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By J. W. STANNARD

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A S P E C T S O F B U S I N E S S

**BEING A SERIES OF SPECIAL
CHAPTERS BY BUSINESS
LEADERS OF TO-DAY**

EDITED BY

G. A. S U T T O N

**DIRECTOR OF THE AMAIGA-
MATED PRESS LTD., ETC.**

EDITOR'S NOTE

WHEN I was entrusted by my colleagues of the Editorial Board with the arrangement of this section of the '*Harmsworth Business Library*,' I fully realised that a somewhat difficult task had been set me, as men of affairs have scant leisure for the exercise of literary composition, and are not readily to be induced to set forth their opinions in print. It seems to me, however, in reviewing the very important contributions which I have been able to secure, that this section of the first volume is likely to prove useful and stimulating.

From a very large list of suggestive topics the limitations of space made it necessary eventually to confine '*Aspects of Business*' to a round dozen chapters. Each embodies the views and experiences of a contributor who has good claim to be heard on that aspect of business he has chosen to discuss. And it is scarcely necessary to add that the opinions thus expressed are to be regarded as personal to the writer and in no wise as representing an Editorial point of view. Throughout the whole Library each contributor has been permitted freely to express his own opinion, even though it conflicts with that of another contributor.

Certain other contributions from eminent business men, intended originally for inclusion in this section, have had to be printed in other volumes of the Library to which they have special application, as otherwise it would have been impossible to keep the present volume within due bounds. To these gentlemen as well as to all the contributors to this section I have to return the thanks of the Editorial Board for their valuable co-operation.

G. A. S.

CARMELITE HOUSE,
LONDON, E.C.

PERSONALITY IN BUSINESS

The Study of Personality : What is Personality ? : How Men differ : Developing Character : First Impressions : The Study of Physiognomy : Two Classes of Men : 'The Second in Command' : The Dutch Courage of Confidence : Virtues of Enthusiasm : Personality of the Employer

BY LORD NORTHCLIFFE

ODDLY enough, it is generally the subject on which a man has been credited by his fellows with the possession of peculiar knowledge that he finds most difficult to discuss with that sense of ease which should be felt by the writer who has something to say. It is not for me to claim that I have any insight into character denied to others, and I am very diffident of accepting the compliment which the Editorial Board of this Library has paid me in suggesting that I can probably provide a valuable contribution to the discussion of what is truly one of the most vital questions in business life to-day.

We have in the journalistic world a somewhat flippant saying to the effect that a man often writes best on the subject he understands least ; and we have the assurance of a great Victorian statesman that the best method of learning a subject is to write an article about it ! If I chose to accept the compliment implied in the invitation to contribute the present chapter to this Library, and to shelter myself behind these aforesaid *dicta*, I might with a clear conscience submit a contribution of no particular value, but beyond question a deep knowledge of his subject is a desirable qualification in the writer who essays to enlighten his fellows thereon, and a man may learn even more from life and actual experience than from the writing of articles.

Whatever gifts I may have or may lack as a student of

*The study
of per-
sonality*

human nature and an observer of personality, as one finds it displayed in the world of affairs, is a subject I naturally shrink from discussing, but I may with modesty be permitted to claim that few employers of labour have encountered larger numbers of men in many varied departments of intellectual and highly specialised work than have fallen to my lot. In the production of newspapers and publications of 'infinite variety,' there is a continual and insistent call for the study of personality. Indeed, it is doubtful if there is any other form of intellectual activity into which personality enters so largely.

To dogmatise about character would be as foolish as to dogmatise about the unknown and partially discovered laws of Nature. In the main it is a nebulous thing, as difficult of definition as the 'fourth dimension,' yet there is probably never a meeting of business men discussing methods and men in which the words 'character' and 'personality' are not freely used. Suddenly to ask a man who is holding forth on the 'need of character' or the 'importance of personality' what precisely he means by either phrase, might be to present a most awkward question. We use the words vaguely: they are thrown out to indicate roughly some idea common in our minds, and yet they may not always convey to others what they mean to ourselves. Knowing the difficulties of definition, I shall make no attempt here to do more than say what is in my own mind when using these words as applied to men.

*What is
person-
ality?*

In a crude way I take it that in ordinary talk one means pretty much the same thing by 'character' as by 'personality.' The subtle distinction between the two is that the character of a man might be described as the inner qualities of his mind and nature, and his personality as the more obvious outward expression of these qualities. Thus, in a sense, one might say that we can come at a man's character by observing his personality. Anything more subtle than this is a matter for the philosopher, not for the straightforward dealer with men, and this very rough-and-ready

definition of what is present in my own mind when these words are used will serve for the purpose of this chapter at least.

It seems to me that there can be no form of business activity into which personality does not enter and does not play its part in failure or success. Economists have claimed—and not without some show of reason—that this wonderful age of mechanism has tended to stamp out individuality. I am free to doubt this opinion, for it seems to me that human personality is something stronger than all machinery; that it will express itself against all forces of circumstance. It is notorious that two men handling precisely similar machines can achieve widely different results. The individuality of man rises superior to the levelling influence of mechanism; personality is indestructible. This may sound suspiciously like platitude, but most platitudes have the virtue of truth, which is less characteristic of the dazzling paradox.

Two men of equal training and experience, up to a certain point in their careers may be equally valuable to their employer; yet he may see in one of them possibilities vastly in excess of those possessed by the other, and this arising entirely from some point of character. The wise employer makes a mental note of these possibilities, and when the occasion comes for testing the opinion he has formed, he does so with confidence. If he has trained his powers of observation well, the test is most likely to prove successful, though I am far from claiming that there is any infallible touch-stone of character. *How men differ*

Personality is, or ought to be, the eternal quest of the employer who is anxious to make the most of those who serve him. It is true that in many of the humbler offices where routine duties are all that is required of the worker, it is little odds from the employer's immediate point of view what the personality of the worker may be; but at best this is a narrow view, and one I have never entertained. An employer is false to his own best interests and to the interests of society at large who does not provide for the

continual progress of his employees, either in his own or in *other* businesses.

*Develop-
ing
character*

I believe I am currently credited with rejoicing in competition, and I do not hesitate to admit that in my opinion competition—within reasonable limits be it noted—is beneficial to all. Where there is room for one there is room for others, and where there is room for others there is room for more. That is why I have stigmatised as narrow-minded the employer who is content to leave his servants rusting in the little corners they happen to fit in his system without regard to their individual possibilities in the larger world of business. The employer who seeks the development of his workpeople on the lines which their individual personalities most readily suggest is true to the best ideals of business. It matters not whether his workpeople so encouraged outgrow the possibilities of his own employment and have to seek elsewhere for a larger outlet for those energies which he has fostered, as the general gain resulting to society will be reflected in its due degree on his own business; but the certainty is that his own business in the process will have benefited greatly. I think this is sound in economics; at all events I am persuaded it is sound in practice.

*First
impressions*

First impressions are important, but not all-important. It is a commonplace that many men unconsciously 'conceal' rather than expose their character in their personality, and have to be studied on several occasions before one can form a just and proper estimate of them. As Tennyson says of words that 'half reveal and half conceal the soul within,' so one might say of personality: it half reveals and half conceals the inner character. But the very fact that A's personality is an open gate to his character, declaiming that 'plain as way to parish church,' while B's is as a bolted door that requires some forcing, is of itself a help to the student of character. For A puts all his goods in his shop window—to use an illustration quite apropos in a Business Library—and gives a better first impression than B, who makes less display, but holds a larger reserve of stock.

The first impression of A might be entirely satisfactory, and later experience of him equally so, while the first impression of B might be disappointing and later experience relatively gratifying. Indeed, the chances are that the final impression of B would be more satisfactory than that of A, although intrinsically there might be little to choose between them. This is the result of the first impression of A having raised very high hopes of his ability, while the first impression of B left one in some doubt as to his qualities. All this—which is, of course, only the rough suggestion of what is in my mind—tends to show that one has to be careful of these first impressions, and to have the courage to revise and modify them while maintaining fairness and justice to both A and B, who, it must always be remembered, may both have been absolutely natural and unaffected at the first interview. Truly, first impressions are very often lasting, and the curious instinct, which many women and few men possess, of divining character at first meeting absolutely through the senses and by no effort of the mind, is a quality to be envied by all whose lot in life is to deal continually with many diverse types of human personality.

The study of physiognomy is one that should not be neglected by those to whom this question of personality is vital. Do not let me be thought for one moment an out-and-out advocate of such pseudo-science as phrenology; but I confess that, while reluctant to endorse the notion that the outward formation of a man's head is sufficient to reveal his inner character, I am prepared to believe that not a little of the so-called 'quackery' that passes for scientific study has some basis of truth. Just as Dean Swift told the boy who was stroking the shell of a tortoise 'to please it' that he might as well stroke the Dome of St. Paul's to please the Dean and Chapter, so it has been urged one might as well feel the 'bumps' of a house to discover the character of its inmates; though I am really not so sure that the outline of a house does not sometimes convey some notion of the character of those inhabiting it. At all events, I am convinced that a man's face is something of an index to his

*The study
of physiog-
nomy*

inner self. There are certain popularly accepted physical indications, such as the width between the eyes, indicating greater or lesser degrees of intelligence and alertness.

I shall not be expected to go into details in this connection, and in all probability it would be difficult to find a group of authorities agreed as to these physical indications of psychological qualities, but each for himself will evolve some method of noting and being guided by personal appearances. It is altogether too large a subject for treatment in detail. I have actually heard of one student of character who pinned his faith to the evidence of boots and shoes; maintaining that the manner in which people wore down the heels of their boots gave more than an inkling of their character! Fantastic as such a notion may strike one, here again I might be disposed to admit there was 'something in it,' as the little distinctions which mark off man from man are extremely subtle and call for much study on the part of those who are—shall I say?—dealers in personality.

*Two
classes of
men*

Roughly speaking, business men may be divided into two classes: those who do things and those who get things done. I have always thought that the Kaffir name for a certain great Englishman, 'Motlohodi,' which is freely interpreted as 'The man who gets things done,' is one of the finest tributes ever paid to a public man. The man who is perfect in every detail of his work, who may be full of initiative, of resource, and the very embodiment of industry, but who only does things himself and has not the faculty for getting others to carry out his ideas and so to multiply his personality, is the lower of the two types of men regarded solely from the business point of view.

There are many men who can do things, but the men who can get things done are few. It is merely a mathematical proposition to state that the man of the most admirable gifts who does his own work to perfection can never hope to achieve the same measure of success as the man who, with none of the other's mastery of detail and power of execution, can contrive by impressing upon his fellow-workers his

conception of the things he wishes to have done, to make them become in a sense reproducers of his ideas, multipliers of his personality. It is given to some men to be able to say to others 'Do this,' and to others to do things superlatively well. Both have their success and their joy of work, but the stronger personalities are those that say 'Do this' and get it done.

There is one detail which all business men who have had the direction of large enterprises must have had frequently to consider; and that is the question of the 'second in command.' At first blush it may be thought this is a subject rather remote from personality, but it really strikes at the very core of character. There is no surer index of the weak man than his fear of having a colleague next in command who is as strong in character and clever in business capacity as himself. At the back of innumerable failures in business has been the fact that some one man who has climbed to a position of responsibility has been afraid of the competition of a skilled 'second in command.' Wherever there is unmistakable evidence of this disposition in a man of responsibility it should be counted as rather a heavy item on the debit side of his character.

In the study of personality or character, evidence of confidence and enthusiasm is of very great importance. Confidence is a fine thing; but even if it were three-fourths of success, the remaining fourth is indispensable; for, after all, three-fourths of success is not vastly better than failure. We are told by those who have studied the matter that the art of swimming is acquired slowly or quickly according as the would-be swimmer has confidence in himself. There is no doubt that, translated into the ordinary affairs of life, and particularly into the battle of business, this element of confidence also plays a notable part.

I have heard that one of the many freakish American plans for helping the ambitious towards success provides for certain morning exercises in which the student has to repeat aloud to himself—with, I suppose, varying degrees of emphasis—the words 'I will succeed to-day,' and in sitting down

in his office chair to begin the day's work he is to pause for a moment and utter a final '*I will succeed to-day.*' The notion is, I presume, that by telling himself that he will succeed he produces a sort of subconscious force that makes for success. I might describe it as the Dutch courage of confidence, but I gravely doubt that any man by taking thought can generate within himself the real spirit of confidence. It is something inborn, something that can be added to, and something very valuable if it is natural to the man.

Confidence at best, however, is only a factor in success, and is only one of many aspects of character. It may be as harmful to one man as it is helpful to another. If it be not backed up by common sense, by reason; if it rest not on some basis of sound sober thought, then confidence may be a perilous possession. I suppose it is true that as many failures have been made by men who were confident of success as by men who were dubious and lacking confidence. Inversely, I am even ready to believe that as many successes have been made by men who were so afraid of failure that they left no stone unturned to ensure success, as by men who had simply the one splendid impulse of confidence in their success. But the personal equation makes it extremely difficult indeed to generalise in matters of this kind.

*Danger of
confidence*

Evidence of confidence alone, then, should not weigh overmuch with the employer who is studying the characters of the men who are to serve him. He must have some other standard whereby to estimate their varying qualities. He knows full well that confidence may be the companion of absolute incapacity in certain business essentials; that it is a quality which may occasionally run to foolhardiness; that its possession does not necessarily imply judgment and the sober mind.

I think I have already hinted at some of the other personal qualities that reveal character, and the possession of which, together with confidence, would leave little room for doubt as to a man's personality; but of all the qualities worthy of admiration and calculated to tend successward in a man of

business, I should incline to place enthusiasm highest. This, too, is a characteristic whose presence, like that of confidence, may not imply certain other absolutely essential qualities. But enthusiasm is a thing that some personalities radiate, and often it covers a multitude of shortcomings.

The self-confident person who lacks the ability to give his plans shape and direction only succeeds in presenting a personality that repels, that prevents others from co-operating with him towards his own success. But the man who is afire with enthusiasm for some enterprise which, single-handed, he could not direct and engineer to success, will often succeed by the mere contagion of his enthusiasm as it affects his colleagues in the enterprise. Enthusiasm is indeed a beautiful thing, and in any analysis of success I venture to think it would be found a much weightier factor than mere confidence. Nothing worth doing has ever been done without enthusiasm, and even when it is misdirected it is not necessarily vain.

One has to be careful, of course, in setting down these thoughts not to overlook the defects which so often accompany the merits. The 'blind enthusiast' is a common phrase of our workaday speech which reminds us that there is such a thing as enthusiasm that outruns discretion. All of us who have fought in the battle of business know that even enthusiasm has failed at times to carry the day, and just as much as a man may burn with enthusiasm in the heat of the fight, so may he cool down in the chill of failure. Indeed, there are different kinds of enthusiasm. The only right kind is that which sees success ahead and works steadily towards it with a strong conviction of attainment, but if the opposing forces eventually prove too strong, does not give way to despair, but speedily generates a new enthusiasm for some fresh enterprise and conveniently forgets the one that failed.

I have spoken of the defects which are nearly always the concomitants of the higher qualities of personality. These might be stated thus: Enthusiasm often implies a restless spirit, keen at the beginning of a venture but cooling

soon after the excitement of the start. Confidence too frequently obscures the defects of the situation to be faced. Caution, on the other hand, is apt to paralyse enterprise, and Mastery of Detail to blind one to the broad issues that lead successward.

*Person-
ality of the
employer*

Now it so happens that in the modern business life a sort of impersonal personality—if I may use such a phrase—has been created by the directorial system. Many minds of different types are at work in the management of all considerable businesses and have their influence on the directing personality, so that he becomes, in some sort, an epitome of these many minds, whose influence unconsciously modifies his own personal impulses. The result is that while the business may receive its direction from one mind, that mind has corrected the defects of its qualities by encounter with the others; it is, in a sense, a composite personality that emerges.

And this brings me to what ought really to have been my first concern rather than my last—the personality of the employer. So far, I have been tempted to dwell chiefly upon the characteristics of colleagues and employees; but on the principle that ‘who drives fat oxen should himself be fat,’ the employer who deals in personality must himself possess it. . . . And now I know why I have not touched upon this important point earlier—it is not so much a question of personality as a personal question! As it is only the wisest of men who know themselves—and I make no claim to superlative wisdom—I shall leave the matter where it is, in the hope that my somewhat random remarks may, at least, have proved suggestive to those who have, or may be called upon to have, much dealing with men.

THE MODERN SPIRIT OF CO-OPERATION .

Foes who should be Friends : Inequality of Men : Causes of Unrest : Function of Capital : Wastage of Labour : Strikes must cease : A Works Council : Furness Conditions of Co-partnership : The Scheme abandoned : The Supreme Virtue : Profit-sharing : Personal Security : Why Trade Unionists object : Workers are suspicious : Future of Copartnery

BY LORD FURNESS

HEAD OF MESSRS. FURNESS, WITHEY AND CO. AND THE
FURNESS LINE OF STEAMSHIPS

THE commercial prosperity of a nation depends, in a very large degree, upon the cordial co-operation of Capital and Labour, and if in these days of keen rivalry in the world the industries of this country are to maintain their international status, the relations between Capital and Labour must be so adjusted that it will be palpably in the direct interest of both to work to one and the same end.

To-day we find the forces of these two great powers for the most part opposed in battle array, covert where not open, with results which cannot unhappily be described in lesser terms than calamities. *Foes who should be friends*

As has been all too evident of late, the close federations of workers *outside* the works must, in the end, spell ruin to the industries of this country unless some means are found of inducing them to work in harmony with the federations of the employers. I would not interfere with this co-operation outside of the works, rather would I make it an argument, a strong argument, for the introduction of co-operation within the works. For what is needed to-day is federation *inside* the works—a federation of goodwill between masters and men—harmony instead of discord.

The causes of industrial unrest are too numerous to specify

in detail, but, generally speaking, they are to be traced to the unequal, and not seldom unfair, distribution of the world's rewards. Such of these as are not founded upon ability and merit, few people, I think, will attempt to defend, but where the reward is the outcome of the personal activity or developed ability of the individual there is everything to be said.

*Inequality
of men*

Differences of brain power, differences of hand power, differences of muscular power, differences of character, being what they are, and human nature, above all, being what it is, I cannot perceive, even in the faintest way, how one is to get from inequality of service anything less than inequality of reward. However much we may desire it otherwise, I am afraid that, on this side of the millennium at least, the superiority of the wages of ability must be accepted as an axiom of our economics.

*Causes of
unrest*

Among the many causes for the unrest among the workers I venture to mention two. These are: (1) the teachings of the professional agitators, who incite the men to discontent by contrasting the lot of the managers and employees; and (2) the substantial dividends declared by public companies, which are put in mournful comparison with the artisan's condition and prospects.

The justice or injustice of these things I have no desire to discuss at the moment, but certain it is that most of the strikes of to-day are the outcome of a misunderstanding of the mutual positions of employers and employees, and the true relationship of the one to the other.

For my own part I always consider the active forces of the industrial world as a trinity: Enterprise, Capital, and Labour, no one of which can well do without the other. The adjustment of the relations of these forces is an extremely difficult matter: indeed, it is my opinion that the interests of the three can never be quite harmonised—all that can be attempted with any genuine hope of success is the harmonisation of the *associations* of Enterprise, Capital, and Labour.

When Capital and Labour come together at the summons

of Enterprise, they do not come together on the same footing, for Labour is not in a position to share in the risks which Capital can afford to accept. Labour is desirous of a ready market ; it must be able to dispose of its product quickly, it cannot even wait until the article it is making is finished, not to say sold. The provision of this ready market is one of the services that Capital renders, and for which Capital has to be paid. *Function of capital*

The only basis on which Capital and Labour can enter into relations is primarily that of buyer and seller of a commodity called labour, and all attempts to produce a more satisfactory co-operation between the two forces must rest upon a recognition of this great central fact, which leaves the working man free from all the entanglements of speculation, often so disastrous in their results.

In some way or other I am responsible for the employment of about 40,000 men and boys—with a total wages bill of between £60,000 and £70,000 weekly.

A close and detailed analysis of the costs of production in the various industries (taken before the institution of the copartnership scheme) revealed the existence of an enormous amount of wastage traceable to stoppages of work on the part of the workmen—perhaps not so much in the form of general strikes as in stoppages caused by differences between sections of workmen (and their trade unions) as to the demarcation of work—disputes in which the employers had no concern at all, apart from the concern, the serious concern, in the loss of time and labour-cost which the friction involved.

At the time I took these figures (in December 1908) I found that in the twelve months preceding that date the total wastage entailed on Labour a loss of no less than 21½ per cent. of the total amount of the wages bill, and on Capital an immediate loss of 9½ per cent. on the actual aggregate capital employed.

With wastage of labour, and with it, of course, a consequent and corresponding waste in rent charges, plant charges, and administrative expenses, on a scale so *Wastage of labour*

alarming, it is not surprising that I came to the conclusion that if we were to continue our existence as a community of value and distinction, it was utterly impossible that things should go on as they had been doing, and that a radical change of relationship between Enterprise, Capital, and Labour was, in certain of our great industries at any rate, an imperative necessity.

It does not require many words, I am sure, to prove to any one (even though he be unacquainted with the working of a great industry) that the effectiveness of such complex organisations as are some of the great industries of the country—in shipbuilding, for example, the members of some twenty different trade societies are linked in the loose bonds of a common employment—is dependent upon the reciprocal movements of their units, and that cessation of action on the part of any given members disorganises the whole machine.

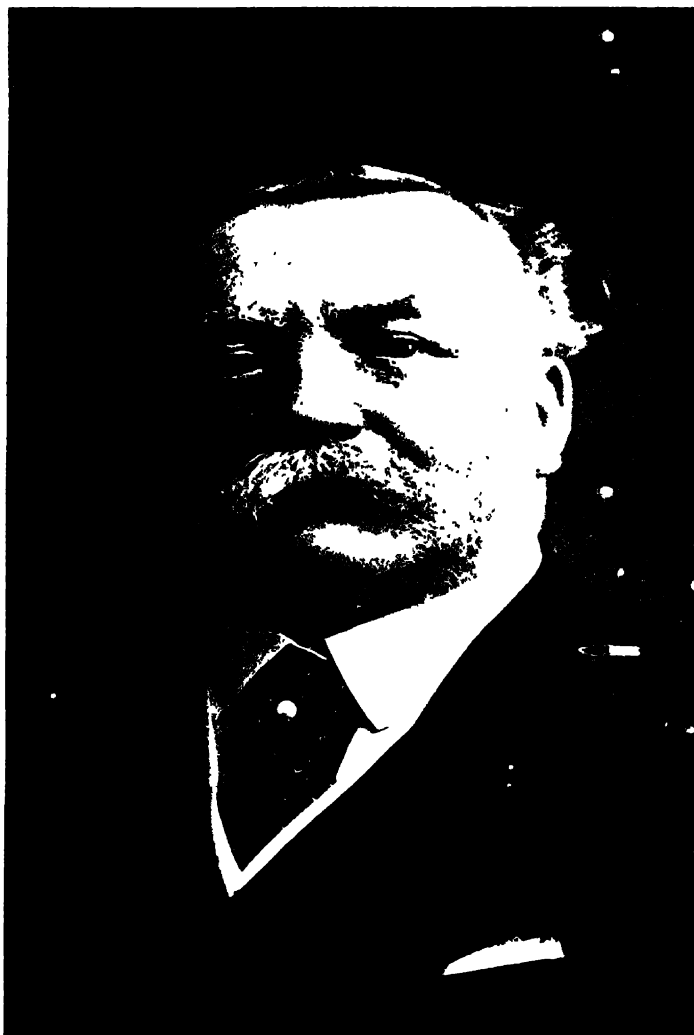
The whole point at which I have aimed therefore in my copartnership proposals has been the abolition of the strike and its corollary, the lock-out, both of which I hope soon to see consigned to the forgotten limbo of the past.

*Strikes
must cease*

When one is dealing with unorganised industries, or starting new works, particularly on a small scale, and on co-operative lines, the conditions regarding the absolute prohibition of strikes may not be fundamental; but when the principles of copartnership are applied to large established industries employing trade-union labour—and that not merely the labour of one simple trade union, but conceivably a score of unions—I am firmly convinced that if the principle is to have a reasonable opportunity of proving its merits, it can only be achieved by insisting that strikes shall cease.

In laying down this rule, however, I have no desire to attempt or advocate anything contrary to the spirit of our times or of an unnecessarily harsh or autocratic nature.

In the scheme adopted at Hartlepool in connection with the Middleton Shipbuilding Yard and the Harbour Dock-yard under my chairmanship, as against the elimination



LORD FURNESS

March 1910

Who contributes 'The Modern Spirit of Co-operation'

of the liberty to strike, there were provided several remedies against wrong, actual or imagined, the chief of these being representation to, and consideration by, the Works Council, and resort to arbitration (the result of which all parties engage to accept in the spirit of good-partnership). Surely such provisions as these are strike substitutes worthy of every respect.

This Works Council at Hartlepool, composed of an equal number of representatives of the employees and representatives of the firm, became a kind of Court of Reference and Committee of Counsel rolled into one. Its chief purposes were the promotion of friendly communication between the firm and its labour partners on all affairs of common interest, and as an important part of its duty to take into consideration on the instant, before any ill-temper had entered into them, all matters or incidents calculated to breed friction in all or any of the departments of the establishment. It served as a medium for the asking of straight questions by the men on any matter of concern; and, on the other hand, it was used by the officers of the firm to convey frankly to the representatives the knowledge of any circumstances or conditions that might at the moment be influencing the business prospects or efficiency of the company.

The general conditions which attached to the participation of the workmen under my control in the copartnership may be summed up in the following sections:

(1) While the board of directors retained for the officials of the company the full power to employ men as the circumstances of the moment might determine, the general conditions of working and payment accepted by their union were duly recognised.

(2) Every employee—whatever his status (for, according to my standards, labourers have rights equally with other members of the working-class community)—became a member of the copartnership by signifying assent to its principles, and by acquiescing in the regular deduction of 5 per cent. from his pay until the shares to be allotted to

*A Works
Council*

*Furness
conditions
of copart-
nership*

him, and which he had to apply for, became fully paid, thus enabling him to acquire his holding by gradual instalments. No employee could continue in the service of the company for more than three months unless he became a copartner.

(3) The labour copartners—who, in other respects, were as the workmen of their class, not forgetting the legal rights conferred on employees by the Workmen's Compensation Act—participate to the extent of their share holdings in such profit as might from time to time be paid in dividends by the company. Large and small shareholder alike were on precisely the same footing in that respect.

(4) The control of the company's affairs was vested in the board of directors, and no one other than the management possessed authority to engage or discharge workmen, and their responsibility was to the board alone. Alongside of this existed the Works Council, whose composition and chief duties I have already described. •

(5) The above outlined arrangement, alike in its parts and its entirety, was, as already stated, subject to the cardinal and supreme condition that in acquiescing in it, the copartners, while accepting the hours, wages, and other conditions of labour, actually secured generally by the other members of their trade unions throughout the country, agreed to substitute on the one part for that barbaric instrument the strike, and on the other part for the equally out-of-date instrument the lock-out, conciliation by the Works Council, or, this failing, arbitration by a court of representatives of employers and employees, and presided over by the County Court Judge of the district or his nominee; the chairman of such court to be regarded in the last resort as final arbiter in all matters of dispute.

*The
scheme
abandoned*

I make no claim that the principles I have outlined here are perfect in all respects. At a great mass meeting held at the Grand Theatre, West Hartlepool, on November 14, 1908, the men pledged themselves, without a single dissident, to give the experiment a year's trial. Unfortunately, at the end of the twelve months the men decided by a narrow majority to discontinue the scheme. This, however, was

through no fault of my own, and though, without doubt, if the scheme had been given a longer trial improvements would have suggested themselves from time to time in some of the minor points, yet the outline of my scheme appears to me to contain the main features along which copartnery will and must develop, and I should like to take this opportunity of stating, with all the emphasis at my command, that I am still convinced of its efficiency, given legitimate trial, as a method to ensure the content and welfare of the employees in most branches of industry and commerce.

When I first formulated this scheme a few years ago, the great question with me was, How can I prevent the constant friction, the wearying, demoralising friction, which was then bringing the very existence of an ancient, a great, indeed a cardinal industry of our country into jeopardy?

This being so, it will easily be seen that the exclusion of strikes, which in my judgment is embodied in—nay, is the heart and soul of—copartnery was, in my eyes, its *supreme virtue*; in fact it was the absence of the contingency of the strike under the principle of amity and friendly association that first attracted and then anchored me to it.

The whole value of the scheme is that it is designed to build up the organisation of a smooth-working machinery, directly intended to develop harmony, obviate waste of effort and material, and generally to promote the content and prosperity of all concerned.

The idea of a strike by partners against partners—the action of one set of partners bringing the business of the firm to a standstill, it may be for months, until another set of partners have acquiesced in the other's views of things—is quite at variance with the entire spirit of copartnery, and I cannot imagine that any one who supports the principle can lament the absence of liberty to strike.

At the time that I instituted the copartnership scheme at the works under my control, the position had reached such a critical stage that continuance of the strikes would have meant the strangulation of the employers and the suicide of the employees.

Profit-sharing

As regards the sharing of profits under the Hartlepool scheme, the men received 4 per cent. fixed and guaranteed interest on the shares they had purchased by the easy-payment system, and they shared with the holders of the ordinary shares in the company whatever sum might be left after the apportionment of 5 per cent. for capital, and proper provision had been made for depreciation, reserve, and development, such amount being divided on the basis of the individual holdings of shares. In this way the men received not only a portion of the profit made upon their own labour, but also a share in the sums won by foresight and initiative of Enterprise and the staying power of Capital.

As to the actual payment to the men of the amount of their profits, the outcome of the experience of a number of firms in profit-sharing is an insistence that the proportion of profits which goes to the employees shall, in part at least, and certainly until the special employees' shares are fully paid, pass to the credit of the shares held by the profit-sharing employees, who, in the case of my own experiments, included all the men and boys in the company's employ. It has been found by experience that if any other course is pursued the benefits of discipline and the sense of solidarity with the firm are largely lost, and even at the cost of inconvenience in individual cases these must be secured if the scheme is to be brought to an assured success.

Personal security

So far as the bare monetary aspects go, this is the essence of the copartnership scheme. But the dividend which most people hope to attain as its most profitable result is not the monetary gain whatever its measure, but the return which it gives to all in a greater freedom from individual worry and a more constant personal security.

Copartnery spells something more than mere money-making—it spells also intimacy, friendliness, and, above all, loyalty in work and deed. As a commodity purchased for a given price, there is no logical ground, I acknowledge, for the representation of Labour in the administration of a company. But most progressive business men of to-day will recognise that success in business depends largely upon

proper relationships between employers and employees, and the time has come to 'scrap' certain notions and conceptions which, however serviceable they were in their generation, have obviously passed their prime and cannot profitably inspire the conduct of business to-day.

The time has come to fly to amity as a haven of refuge from the sickening course of friction between the forces of Capital and Labour, and even though, as a sort of by-product, amity will make both the employee and the employer richer in the mere workaday meaning of the word, I think all wise employers and employees would value it for the atmosphere of reason, the elevation of thought, the stronger disposition towards cordial relations and co-operation of forces which it invariably brings in its train.

I have stated the case for co-operation as well as I am able to do in the brief space at my disposal, and now perhaps I may deal with some of the objections that have been made to the scheme from time to time. At the time that I made the proposal at Hartlepool one of the greatest objections made to the scheme was that it was liable to deal a severe blow to trade unionism. One of the most up-to-date authorities on the subject of trade unionism observed, a short while ago, that economic history is beginning to testify that as the pay and conditions of labour improve, the weaker trade unionism becomes, and there is reason to believe that largely on this ground trade unions have hitherto looked somewhat askance at profit-sharing schemes.

One of the most influential trade unionists declared that trade unionism would exhibit none other than a friendly attitude towards copartnery so long as copartnery did not seek to cut the ground from under the feet of trade unionism. But, as I have already indicated, it was not my intention to destroy the trade unions in association with the works under my control, while seeking to end the friction that threatened to ruin the industries in which I was concerned.

In addition to a representative from each trade employed in the works, I invited to the 'Works Council,' or, as I

*Why
trade
unionists
object*

prefer to call it, our 'Family Council,' the secretaries or local representatives of the numerous unions in the area having members engaged in the works, and I had endeavoured to make them feel that the invitation was extended with the best of goodwill on my part as well as with the goodwill of my employees.

*Workers
are sus-
picious*

Another objection that might possibly be raised is that, by putting unnecessarily large sums aside for reserve, depreciation, and similar purposes, the men might be deprived of a fair return on the capital they invest. I am aware that a section of working men criticise the amounts laid aside by some companies for these various purposes as being devices for concealing the real earnings of the company from their employees. The dividend declarations of those companies which treat the necessity for these important deductions lightly are used by the employees as whips wherewith to lash the companies who are more prudent, on the ground that they are merely dodges for depriving the artisans and labourers of wages to which they are entitled. But these allotments, though they may vary from year to year, cannot be dispensed with if the directors have any regard to the continuance of ~~the~~ company in reasonable prosperity. A captain of industry who wishes to be regarded as other than a fool must make provision for the replacing of his plant and machinery, not merely in view of the wear and tear it is constantly undergoing, but also in view of the possibility that, any day, portions of it at least may need to be superseded for some device more rapid or more ingenious—at any rate in some way more economical. If he desires to have credit as a practical man of business, the same captain of industry must estimate for possible losses as well as gains. For instance, there may be a lawsuit over the interpretation of the terms of a contract, with a ship thrown upon the hands of the firm, or, it may be, a case of alleged bad workmanship, or some other reason ; or trade may be so slack or so difficult to obtain that even rents and administration expenses have to be made up, in part at least, out of the reserve fund. Above all, if the

same captain of industry desires to justify his reputation as a man of enterprise—as a man who foresees events and makes adequate preparation for their coming—he must lay up funds for extension of works and other forms of development. In any case it must be borne in mind that, if by reason of fat reserve funds the shares of the company rose in value, the employees' shares would benefit by similar accretions.

Now, a few final words as to the future of copartnery *Future of copartnery* generally. If the many labour strikes of the last few years, following on one another with appalling frequency, have indicated anything, they have indicated that what is chiefly wrong with the industrial world is lack of intimacy between the individual members of its three great forces. Greater intimacy properly established would in a short time bring greater knowledge, greater sympathy, and a closer and warmer co-operation. Whatever methods, new or old, may be commended, of this I am satisfied: If the great industries of the kingdom are to be put once for all on a sound, unshakable foundation, that foundation must be the principle involved in copartnery.

Every year the gravity of the national situation increases, and believing that if we are to meet international competition with any considerable measure of success, it is a condition the most absolute that the relations of Enterprise, Capital, and Labour in this country should be placed on a footing much more friendly, harmonious, and less wasteful than exists at present. I have great satisfaction in commending to all with whom my words may carry weight, an early, a careful, and a sympathetic consideration of the principle of Labour Copartnership.

MODERN COMMERCIAL EDUCATION

Its Field : Its Evolution : A Word with the Sceptics : The Sons of Business Men : What a Faculty of Commerce can do : The Supply of New Blood for Business : Shortage of Capable Men : Need for Interest in Business : The Business Sense : Birmingham University Course : Business Policy : The 'Seminar' : Knowledge of Accounts : Value of Foreign Languages : Technical Knowledge : What Germany is doing : What America is doing : What England is doing : Efficiency

By PROFESSOR W. J. ASHLEY, M.A.

DEAN OF THE FACULTY OF COMMERCE IN BIRMINGHAM
UNIVERSITY

Its field

THE field of 'commercial education' is an enormously wide one—incomparably wider, for instance, than legal or medical or military or engineering education. When we speak of legal education we think of the education of future barristers and solicitors; when we speak of medical education we mean the sort of training that the General Medical Council insists upon as a prerequisite of practice. In the same way, most other forms of special education, indicated by a descriptive adjective, have to do with comparatively restricted professions, with their definite standards and requirements. But 'commerce' has a far broader scope; it includes every kind of commercial activity, from that of the office boy who takes the letters to the post to that of the managing director of a vast and world-wide undertaking. Hence, accordingly, in the public mind 'commercial education' is vaguely associated with a great many very different things.

Its evolution

A couple of generations ago, 'a sound commercial education' meant the acquisition of a clear handwriting, an easy command of elementary arithmetic, the knowledge of a few salient facts of geography and history, with a

smattering of French thrown in as an impressive extra. In its best forms it was a necessary alternative to the misplaced and incompetent classicism of most of the available middle-class schools of the time; in its worst forms it was solemn humbug. In the succeeding generation 'commercial education' became associated with shorthand and typewriting and with what called itself book-keeping: its object was supposed to be the production of clerks who could hold their own against the German invasion. Now, in our own day, we have seen the advent of 'higher commercial education'—an education represented by University 'Faculties' and 'Departments' and 'Triposes.'

It has to be frankly recognised that, before we can profitably discuss commercial education, we must come to some sort of understanding as to the type of commercial education we are going, for the time, to have in our minds. In this chapter I propose to speak only of 'higher' commercial education—education 'of a university type.' I believe that there can be such a thing, and that under present-day conditions it is increasingly necessary. I mean by it an education for young men who have already had a fair secondary-schooling; a training which takes hold of them at seventeen or eighteen, and occupies their working days for three consecutive years; a training which is as serious and makes as great demands on their mental powers as a degree course in arts or science. And, of course, the very statement of such a programme implies that what we have in view is the education of the future officers and commanders of the commercial army, not of the rank and file.

This idea of a university training for business life is so novel a one in this country that it will require time to make its way. The commercial world is not likely to be persuaded of its value by the mere representations of university teachers. Most business men, I have not the least doubt, who set about reading this article, have noticed that its writer is a 'purely academic person,' unconnected with any big business, and have accordingly started with a more

*A word
with the
sceptics*

or less conscious intention to take what he has to say with a very large discount. And this is a quite natural and proper feeling. No really successful educational movement can be the creation of 'educationalists' only; it must satisfy some conscious need of contemporary society. It will be my purpose to explain what I consider this need to be in modern commercial life. But nothing is gained by disregarding the obvious facts of the situation. So I want first to acknowledge, in the most unmistakable language, that the hesitation and scepticism with which a good many business men regard anything like a 'higher' commercial education is not without some excuse.

The advocates of the new movement sometimes adduce the analogy of medicine or engineering. Even in medicine, they point out, the idea of a systematic education for the ordinary practitioner is quite a modern one. The analogy is certainly helpful; but, after all, it only carries us part of the way. For commerce differs from a profession like medicine quite as much as it resembles it. So long as the present competitive organisation of society lasts, it is not in the least likely that the right to set up in business or to be appointed manager or director will ever be made conditional on the passing of a qualifying examination. Commercial success will continue to be gained from time to time by men of the scantiest education. There will always be a few untaught business geniuses; and there will always be a much larger number of men who, without being geniuses, make their way by dint of opportunity and shrewd sense. The direction of commercial undertakings is never likely to become a closed profession; and it would be bad for the world, in more ways than one, if it did.

*Untaught
business
geniuses*

But is the recognition of this obvious fact a surrender of the case for higher commercial education? I think not. Grant that this country has got along pretty well, until recently, without any specifically commercial training worthy of the name; grant that, if we go on as we are, a certain amount of business ability will spontaneously

work its way to the top—is there no cause for dissatisfaction left ?

Let me ask two questions. First, what are business men to do with their own sons ? The class I am thinking of is that large body of business men who have ‘substantial business interests,’ and who will be able, when the right time comes, to secure for their sons promising openings into business life, and perhaps, in due course, to help them with a little capital. They send them to the ‘public schools’ or the great grammar schools. If they happen to distinguish themselves very much in the usual school studies, the headmaster or housemaster will probably suggest that they shall go to one of the older universities. In that event, they are pretty sure to be lost to business.

But suppose the more usual case of the boy who does not particularly distinguish himself at school. His father intends him for a business life. What is he to do with him between, say, seventeen and eighteen and twenty or twenty-one ? Any one who knows much of the business world knows that this is a constant source of perplexity. It is easy to answer, “Let him go into the office (or workshop, as the case may be), and learn the business from the bottom up.” Often that is easier said than done. In the first place, unless the father can keep the young man under his eye, the position of ‘the governor’s son’ in an office or works is notoriously apt to be rather demoralising. Yet, with the increasing scale and complexity of modern business, it becomes increasingly difficult to keep the son under the father’s eye.

What many a father learns only from hard experience is that it is hopeless to expect from a son who knows he hasn’t to depend entirely on himself, who has been brought up in comfort and with a healthy schoolboy’s love of games, the same sort of keenness and application that the father may have shown at his age, when the family fortunes were all to make. It is easy to understand, therefore, why many business men prefer, if they can, to put their sons, for the first two or three years, into the office of a friend. Here, again, is the fundamental difficulty that, in a great deal of modern

business, things are so subdivided and specialised that it is not easy, with the best will in the world, to exercise a tactful supervision over a youth, and see that he is given just that job to do, at the right stage, that will constitute the best experience.

I have known business men put their sons for a time into an accountant's office 'to learn business.' The plan has sometimes answered; but after all it is very much a matter of chance whether the young man does get any valuable experience in this way or not. Or rather the odds are heavily against him. For such work as he is capable of doing, without a great deal of help and supervision, is not likely to be particularly instructive. And for a really first-rate accountant to give a lot of time to explaining things to a young man and watching how he handles them—well, that is a good deal more desirable than feasible.

*What a
Faculty of
Commerce
can do*

Under such circumstances, what a well-organised Faculty of Commerce can say to parents is something like this: 'We believe that we can do better for your sons during the next three years than you can do yourselves—looked at even from the strictly utilitarian point of view. The university does not, indeed, limit itself to the utilitarian point of view: it believes that university studies and university life, without interfering in the least with "practical" objects, may give your son intellectual interests such as will make him a finer gentleman and a more useful citizen. Putting that consideration on one side, however, and thinking only of the commercial work your son has ultimately to enter upon, we believe that we can make a more profitable use of his time than you will find possible in any other way. Remember also that study in a modern university with a Faculty of Commerce—a university like that of Birmingham or Manchester—is not a cloistered seclusion. Your son, though he comes into touch with other interests, will not get out of touch with the business world. Besides, there will be plenty of opportunity, in the vacations, of inducting him gradually into office work, if you think it worth while.'

Let me now ask my second question, and this time of

the business community generally. In the absence of a systematic business training, do the leaders of business enterprise find there is really an adequate supply of young men of initiative and judgment, young men who are ready to take responsibility and are fit to be entrusted with it? I suppose different answers will be given to this question according to the kind of business we have in mind. Where all the thinking and deciding is the work of two or three principals, and the employees are 'mere' clerks, no sense of dearth is likely to be felt. But in the great manufacturing concerns there is reason to believe that neither the ordinary office staff nor the ordinary works staff can always be relied upon to produce men capable of anything more than routine service.

Here is what two successful business men of the Midlands, conversant with the organisation and management of great concerns—Mr. Hipkins of Avery's and Mr. Gibson the well-known accountant—have said on the subject :

‘In the *departmental* administration of large concerns, technical skill is so evidently called for that experts with the highest available training are employed in subordinate positions of authority. Yet this country has hitherto neglected the training of *general* managers, who not only engage and superintend these experts, advance them for proved competency, or dismiss them for inefficiency, but, at the same time, have the responsibility of buying materials to the best advantage, deciding as to the extension or replacement of plant, assuring the disposal of the output, and planning financial policy. Every director of an industrial company has doubtless experienced the difficulty of filling the position of executive head of a commercial concern.

‘In some cases, departmental managers are thought capable of assimilating the knowledge necessary outside their own special branch, or, more frequently, clever clerks acquire some technical insight into departmental work; and, when a vacancy occurs in the post of managing director or general manager, it is filled by promotion from one or other of these sources. Not infrequently the results are

disastrous: for the training of the departmental expert is often found to unfit him for general management; while the promoted clerk is entirely in the hands of the departmental experts whom he has not sufficient knowledge to control.

'In banks and other financial institutions the like difficulty exists in an equal degree; for the strict discipline necessary in the subordinate grades of service does not tend to develop the sound and quick judgment that is required in positions of control.'

*Shortage
of capable
men*

Many as are the men of natural business ability who somehow make their way upward, it is pretty commonly felt, I understand, that there are by no means enough of them to go round, and that the spontaneous working of the industrial machine certainly does not always throw them to the front just when they are wanted.

Perhaps my readers will now let me assume that I have made out something like a provisional case. The possibilities of higher commercial education ought seriously to be considered. The next question is wherein that education shall consist. Here, again, we may as well be frank. The absolutely essential thing is that the student should be enabled to realise that business, properly regarded, is full of intellectual interest. Too commonly the young Englishman thinks business a dull thing, a thing from which one earns a living, but from which one can hardly be expected to get much mental satisfaction. He has to be made to see that the successful conduct of a business means the right decision, as they arise, of a never-ending series of problems of policy. No instruction, indeed, can possibly inform him beforehand just how the problems are to be solved: commercial teaching can never be a set of recipes for making money. All it can do, and that is a great deal, is to create the frame of mind which realises that there are such and such problems, and which grasps the sort of considerations by which they ought to be determined.

It is not everybody who is capable of that frame of mind; and that is nothing to be surprised at: it takes all sorts

to make a world. Yet I am sure, as the result of a good deal of experience, that there are any number of young men who are capable of being roused to this keenness of interest if the subject is properly presented to them. For fear of misunderstanding let me add that the 'intellectual interest' of which I speak is not necessarily bound up with pecuniary interest. It is the glow which accompanies any pleasurable exercise of the mental powers; and in this case it accompanies the conscious disentanglement of the points of vital significance from a mass of irrelevant detail and the conscious balancing of relative possibilities and advantages. Such an intellectual interest is not only necessary when a business man reaches a position of responsibility: it is necessary if a young man is to make his way with unimpaired faculties through those early years, of most occupations, which are bound to be largely occupied with deadening detail and routine.

As compared with the awakening and guiding of business judgment, all mere information—all mere technical dexterity—is of slight value. Nothing has done more harm to the cause of higher commercial education than the idea that to be able to 'keep' a set of 'books' or to write a letter in French, to know the meaning of a number of technical terms, to be acquainted with the definition of a contract—that these of themselves constitute a valuable commercial equipment. They are, of course, qualifications which have their price on the market; like shorthand or—on a lower level—typewriting. But they do not necessarily bring with them the supreme qualification of business sense; and while they can be taught in such a manner as to help to bring out business powers, they can be taught in such a fashion as actually to get in the way.

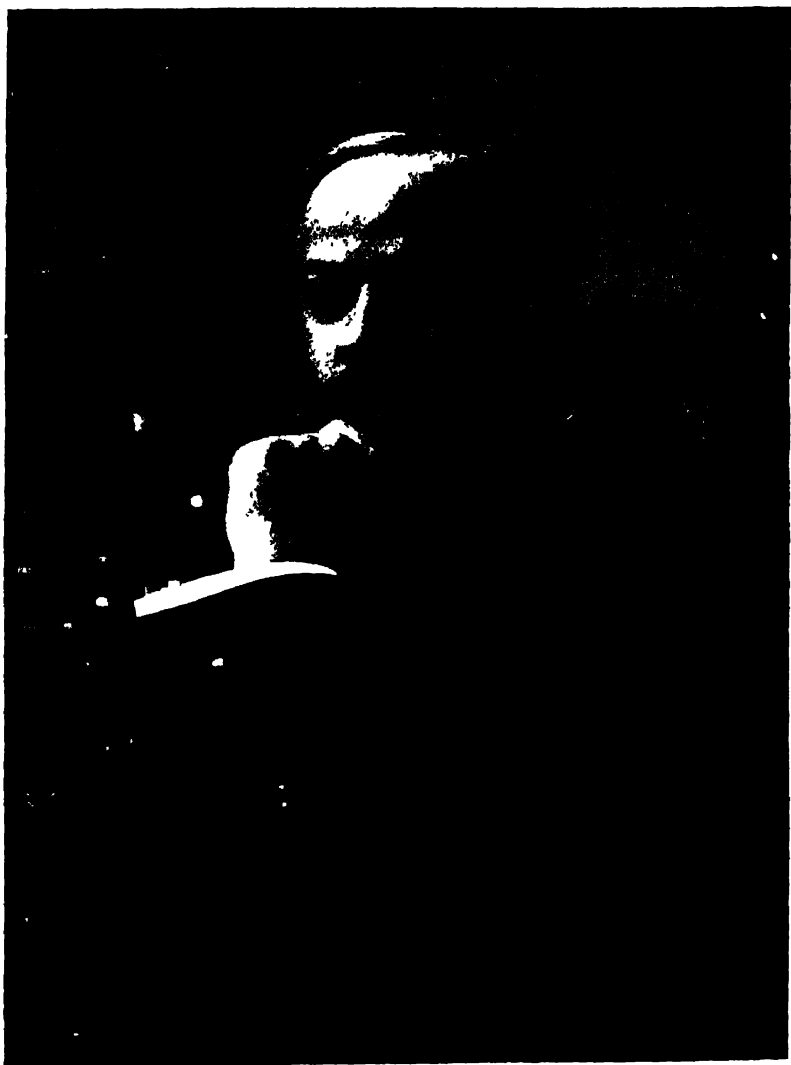
There is no one quite obviously right way of constructing the curriculum of a Commercial Faculty. Everything depends on the personality of the teachers and on what they make the several courses to mean, rather than on the names that are given to the courses or even the syllabus of contents. There are almost as many possible ways of

constructing a commercial curriculum as there are, according to Mr. Kipling, of constructing tribal lays; and it is as true of them, worked in the proper spirit, as of tribal lays that 'every single one of them is right.' But the proper spirit is essential; and that is the spirit which constantly remembers that the goal is the power of business judgment.

Birmingham University course

Perhaps I may explain how we in the University of Birmingham aim, first directly and then indirectly, at this goal, without in the least implying that we have reached perfect methods or that other universities may not be wise in arranging things differently. We begin, in the first year, with courses which are designed to give the student a sort of general notion of the business world. First comes a little sketch of the history of trade and manufactures, and then an account of the present position and organisation of the chief British industries—agriculture, coal, iron, steel, cotton, wool, &c. Then we go on to a similar outline account of the business situation in the chief British Dominions—Canada, Australia, and South Africa, as well as of India. The quantity of bare 'facts' is kept down to a minimum: the purpose throughout is to set students thinking of *causes*. Why is Lancashire the home of the cotton industry? Why is spinning commonly separated from weaving? Why has there been so marked a tendency in the steel trades to bring the various stages or branches under a single control? Why are large farms typical of England? Why does sheep-raising flourish in Australia? Why does Canada sell most to the United Kingdom and buy most from the United States? Why did gold-mining take its modern capitalistic form on the Rand? And so on and so on.

Side by side with this comes a little 'Elementary Economics.' Personally, I am not in the least inclined to over-estimate the value of what is known as Political Economy. It certainly has been over-valued in the past; and there may be places where it is still given an excessive amount of attention. But I have come round to believe that a little undogmatic consideration of the large general forces which



PROFESSOR W. J. ASHLEY, M.A.

Lafayette

Who writes on 'Modern Commercial Education'

affect the production of wealth and its distribution as rent, profit, interest, and wages is an excellent mental exercise for the future business man.

In the second year we go on to a course which deals with our chief commercial rivals and customers, especially the United States, Germany, France, Russia, Italy, and South America. As before, the larger facts only are given, and they only so far as they have significance. The student learns, for instance, wherein consists the present business importance of Westphalia; but he is also asked to consider why that importance has so rapidly developed. In the same year we introduce an outline course on the problems of transport, and on the principles (or want of principles) which have governed railway rates and ocean freights.

After all this preparation we are able to come in the last year to the course to which everything else may be said to be contributory—the course on Business Policy. Each university must, in a matter like this, have regard to the probable needs of its own particular circle of students. If I were organising the courses at a great port, I should lay special stress on ‘merchanting’ and on the management of shipping business; if in London, special stress would have to be laid on the Stock Exchange and financial operations, on banking and on the produce markets. The essentials about each of these subjects are set before our Birmingham students elsewhere in their programme of studies, and notably in a course called ‘The Technique of Trade,’ where they handle in turn all the chief commercial documents, from bills of exchange to bills of lading. But we have thought that for a Midland university it was better on the whole to take manufacturing business for its chief interest. Accordingly we seek, in the course on Business Policy, to consider all the chief questions that are likely to be presented in the creation, financing, laying-out, internal management, and external marketing of typical manufacturing undertakings. Side by side with this runs a brief course on statistical methods, wherein the student

*Business
policy*

learns what statistics are available for business purposes, and how they are to be interpreted.

*The
'Seminar'*

Meanwhile, all this time the student has every year been producing his two or three reports for the weekly gathering which we call by the convenient German term of 'Seminar.' Some couple of months ahead he has been given a business subject to work up, told what books to go to and people to consult. His rough draft is privately criticised; and then he reads aloud his paper to be discussed by his teacher and fellow-students. Beginning with a very humble account, perhaps, in his first term of the Sources of the Iron-ore Supply of Great Britain, he may end with something as difficult as Premium Wage Systems or American Trust Finance. The 'Seminar' is certainly one of the most useful features of our Birmingham system. A young business man ought to be able to write a terse and clear report for the head of his department or for the use of a board, either on the facts to be found in printed sources or on the facts ascertained with regard to some line of trade by personal inquiry. But how few there are who can do work of this kind without some sort of preliminary training!

The courses hitherto described form the central core of the Birmingham instruction. But there are other subjects, which though they are 'instrumental' and not primary, are nevertheless not to be neglected. There must be courses on Commercial and Industrial Law; and quite considerable attention must be directed throughout to Accounting.

*Know-
ledge of
accounts*

By Accounting I do not mean Accountancy, the craft of the professional Accountant, but rather such a knowledge of accounts as every business man ought to possess. Accounting has hitherto been hampered by its associations with what passes in educational circles for book-keeping. It must begin indeed with book-keeping, but it can go on to the most difficult questions, both of form and of substance, of modern finance; and it may most properly furnish the subject-matter for a university course. Suitably handled, Account-

ing cultivates not only exactitude of record but also clearness of thought. And the recent development of Cost Accounts is opening for Accounting an even wider range, and linking together the organisation of 'office' and 'works' in a new harmony.

Yet again a word of warning may not be misplaced. There is quite a danger in German and French colleges—less perhaps in England—lest altogether too much weight should be attached to mere office technique. Time may easily be wasted in causing a class to perform over and over again all the steps necessary in some particular sort of transaction; and in acquiring a knowledge of details of form and procedure which the student may never have to use, and which, if he does ever want them, he can pick up with absolute ease in a few weeks' actual practice.

All the subjects I have so far mentioned have been strictly 'commercial.' But they will not exhaust the programme of a complete university course. Foreign languages have been grossly over-valued in this connection. As a great business man once said, 'If you are the sort of person that is going to make bad bargains in English, it will not help you much to be able to make them in French and German also.' Still, modern languages have an instrumental value. Every graduate of a Faculty of Commerce ought to be able not only to read a business letter in another language, but also—and this is usually much more to the point—to keep abreast of what is being done in his own line of trade abroad by turning over the technical and financial journals of the country in question.

What is less generally appreciated is the value to very many business men of a little technological knowledge. A man who is likely to go into a chemical business, for instance, even though he may intend to remain entirely on 'the commercial side,' will be much the better for knowing something about chemistry. So wide a range of modern manufacture is closely connected with engineering that a general acquaintance with the chief types of machines, a little experience with the ordinary workshop tools, and

the power of 'reading a drawing' will often be astonishingly useful. We are destined, I am sure, to see some remarkable developments in this matter in the next few years. The great technological colleges that have been created in Germany, America, and Great Britain in recent decades offer undoubtedly an excellent training, in the main, for the technical expert. Even for him, they have probably been a little too narrowly technical. It is now coming to be seen that even the engineer may be the better for a little commercial training. That, however, is 'another story.'

It is not the engineer I am thinking of just now so much as the young commercial man in the office of an engineering business. For his particular needs the engineering school has usually nothing to offer. Such a rapid outline course as could doubtless be constructed, setting forth what a man of ordinary intelligence who will 'give his mind to it' can take hold of with the help of elementary mathematics—such a course the engineering school commonly despises as 'a mere smattering.' Ultimately public opinion will probably force the technological schools to make themselves more generally useful. At the University of Birmingham, fortunately, it is already possible for the student preparing for a business career to combine with his strictly commercial studies enough work in the engineering, mining, metallurgical, or chemical departments to get a pretty good general notion of what goes on in 'works.'

*What
Germany
is doing*

Up to this point, I have been trying to argue the case for higher commercial education on its merits. But it is now fair, I think, to point out that commercial education of a university character is by this time something more than a project. In Germany the movement for the creation of commercial colleges of university rank is by far the most important educational movement of this generation: it occupies as large a space in the public mind as the movement for the great polytechnic colleges in the previous generation.

Indeed, by the time the British public had caught on to 'the Charlottenburg idea,' the Charlottenburg idea was

rather *passé* in the land of its origin. The commercial colleges which have now been established at Cologne, Leipzig, Frankfort, Berlin, Mannheim, Munich and elsewhere are no hole-and-corner affairs intended for the evening hours of a subordinate social class. They possess fine buildings and large incomes provided by the generosity of the business world and the great municipalities; they have large staffs of professors under distinguished 'directors of studies,' and they are frequented by thousands of business men's sons from all over Europe. They are not the gift of a beneficent Government: they represent a perfectly spontaneous movement of the business world itself, which is dissatisfied alike with the ancient university and with the new technical school, and now takes the matter into its own hands.

For my part I regret that most of the new German commercial colleges have been established apart from the universities. Business men have a great deal to learn from association as fellow-students with men of different professions; and the loss is one that affects all parties.

• In America the movement, which is similarly wide-spread, has fortunately taken the university direction. Beginning with the less conservative universities of the West, like those of Wisconsin and California, supported by the State and quickly responsive to public opinion, it has spread now to the oldest and most cautious institutions, such as Harvard. Various policies are being tried: sometimes commercial courses are provided for undergraduates as part of their work for the first or bachelor's degree; sometimes they are offered only in a graduate school to men who have already taken a bachelor's degree. There is much to be said for either policy: and in America the crowds of young men of different ages and origins and ambitions who are flocking to the universities are large enough to provide students for institutions of more than one type.

In England, also, the movement has been associated with the universities; but in this country it has been concerned, exclusively almost, with students in the under-

*What
America
is doing*

*What
England
is doing*

graduate stage. The situation here is very different from that in America. There no difficulty is found in gathering students of any age from seventeen to twenty-seven; here the task, first of all, is to put 'the university idea' into the heads of the great business middle-class. That it might be a good thing to send his son to a university, even if he intends him for a business career, is a doctrine that still has to make its way in England. So that, though there are, no doubt, already a certain number of men who have graduated in arts or science and are ready to spend a year or two longer in special preparation for business, they are too few to be specially provided for; and we who are in charge of departments of commerce at the universities will be well satisfied if we can draw to us young men as they leave the secondary schools—instead of their being sent to waste their time in an office, during those precious years when their work might be made so much more interesting and they themselves so much more efficient.

Efficiency With this word 'efficient' I should like to end. And here I might be allowed a word of personal testimony. It is now ten years since I came back from Harvard to organise the new Faculty of Commerce at the University of Birmingham—the first under that particular name of 'Faculty' in this or any other country. It has been a task not inarduous; and when, in the scanty classes of the early years, I recalled the large audiences that thronged the lecture-rooms across the Atlantic, a certain occasional misgiving was perhaps excusable. These misgivings have passed away, partly because our numbers have grown, but also because there has now been time for our graduates to make their way into the business world and show what their training has 'amounted to.' They have proved that the three sessions they spent at the university were not wasted; that they are able very rapidly to pick up all they could possibly have learnt had they been all the time at the office desk; and then to go further and to display a power of quickly mastering a subject and grasping a situation which has surprised and satisfied their employers.

When one leading business man said, 'My son is a better business man than I am, and I put it down to the university,' and another, 'It was the best day's work I ever did when I sent my son to the university,' I felt sure we were on the right track. And I cannot think so meanly of my country's intellect as not to believe that it will soon realise just what it is that Birmingham and other universities, new and old, are now offering it. If this country is to be beaten in the world's competition, it will be no comfort to our ~~practical~~ 'practical' manufacturers and merchants to have been beaten by 'college-bred' Americans and Germans!

WHY LONDON IS THE CENTRE

Geographical Advantage : Virtues of English Law : Our Political Institutions : Export Focus of the World : Bills of Exchange : Lending and Borrowing : The Home of Insurance : Importance of Lloyd's : London Fixes Prices : Our Merchant Marine : The World's Middleman : The Stock Exchange : Supreme in every Branch : London's Efficiency : The Policing of London

BY THE RIGHT HON. SIR T. VEZEY STRONG, P.C.
LORD MAYOR OF LONDON, 1910-1911

*Geo-
graphical
advan-
tage*

IN my opinion one great reason why London is the centre of the world is the fact that it is on the Thames. History proves that the growth of cities has been largely governed by their being built adjacent to rivers. The Thames has given London a maritime as well as a merely commercial and manufacturing outlet for its energies. This alone, however, does not answer the question—'Why is London the Centre of the World?' The more complete answer is that its inhabitants have been pioneers in the development of the sciences and arts applicable to commercial and industrial purposes at home and abroad.

From those contributory causes London has grown to be the capital of the most marvellous Empire the world has ever known—the centre of the Imperial Government, the cradle of liberty, and the place from which the finances of the world are influenced, if not controlled.

London possesses the great advantage that as the capital of the Empire it is acknowledged to represent all that Empire's virtues. For centuries the word of an Englishman has been as good as his bond, and this reputation gives London the foremost place amongst the capitals of the world. We do not doubt that for integrity and honesty the metropolis is equalled by the merchants of

Manchester, Glasgow, Liverpool, and other great cities in the United Kingdom, but the foreigner can only think of London because it is the capital, and therefore to London he first ascribes that faculty for scrupulous trading and rigid honesty which is, however, also characteristic of the nation.

But before I deal more fully with the business supremacy of London I will touch upon the position of London as the headquarters of British law and local government. English law may not be the most clearly codified, but it is held by jurists of international reputation to be the most honest. The men who administer it are held in the deepest respect the world over, and, as a result, the foreigner feels safe in dealing with a country where he knows he can obtain justice, and foreign shipowners wish for nothing better than that their disputes and claims should be adjusted in English naval courts. As for local government, it is admitted that London is the best-governed city in the world. London was the cradle of civic freedom. It has created and developed a system of local government which has been copied by every civilised city in the world. London has influenced for good local government in the four corners of the earth.

Then there is our Parliament. As humanity develops and is educated, the people are gaining their liberties, and as it is only through a properly elected legislative assembly or parliament that they can express their opinions and govern themselves, they are naturally desirous of having the best possible parliament. It is merely repeating a generally accepted fact when I point out that all new legislations are based upon, if not equal in their liberties to those enjoyed in, the Mother of Parliaments, and that it is to London the reformers come for guidance and help. Of course the Houses of Parliament belong to the whole country, but their presence in London is another reason why the metropolis is the centre of the earth.

But when all is said and done, London's supremacy is based upon the fact that it is the centre of the world's trade. I have already referred to the great influence the

*Virtues of
English
law*

*Our poli-
tical insti-
tutions*

metropolis exercises on the finances of the world, and if I hesitate to say that it controls the world's money it is merely because I know that London can prove that it is the centre of things without the aid of exaggeration.

*Export
focus of
the world*

To begin with, London is the export focus of the world. By that I mean that the metropolis, as the result of hundreds of years of trading, has gained the confidence of the whole world, so that goods which come from it bear the London mark, which is accepted as the London guarantee, and as such are accepted by traders all over the globe. To be sure London does not fix the price of everything—cotton is a notable case in point—but experience has proved that to do a big business the firm concerned must have a London office, while the fact that this is a free-trade country gives the port of London an added attraction in the eyes of the foreigner. Millions of pounds' worth of goods are sent to London to be, in turn, exported to other countries, and, of course, London benefits in many ways. There are such things as insurance, brokerage, shipping, and bills of exchange, from which London draws its money and increases its employment. All these things go to consolidate the prestige and position of the metropolis.

Of course London's great position is primarily due to the long start we had of other nations. The perfect system we have of dealing with bills of exchange, the financial supremacy of the Bank of England, and, indeed, our banking facilities in general, are the result of centuries of work and experience. These advantages are placed at the disposal of anybody who cares to come to London, and we know that they do come in their thousands.

America has found in London the only centre from which to create a world-trade of its own. Even when dealing with the South American Republics the leading business men of the United States have had to start offices in London in order to increase and develop their export trade. This may seem rather remarkable to the man in the street, but the explanation is simple. In doing a large export trade cash is seldom used, bills of exchange taking their place.

Now the South American trader knows nothing of the credit of firms operating in North America, and in turn they know nothing about him. But both parties want to trade, and while one wants cash the other requires credit. In their dilemma they must have recourse to bills of exchange, and for this they must take advantage of London's perfect organisation as well as London's credit and financial standing. A London bill of exchange can travel round the world and practically pass for currency all the time. Thus ~~it is~~ necessary for any firm to get the advantage of London's reputation to open an office in the metropolis.

A bill of exchange is a complicated matter and not easy *Bills of exchange* to explain to the lay mind, but I will take a case in point and use it as an illustration. We will suppose that a firm in Chicago buys a thousand pounds' worth of goods for a customer in England. The goods are shipped, and the Chicago firm gets its bill of lading from the shipper. Now as some weeks must pass before the English customer gets his goods, the Chicago firm would have to wait for the money were it not for the bill of exchange. The Chicago firm, therefore, draws up a bill of exchange on London in the name of his English customer, payable in three months, and along with the bill of lading takes it to his own bank where, in exchange, he receives in cash the price of his goods which he has shipped to England. The bill of exchange reaches a London bank in due course, and the latter gets the English customer to endorse it, thereby promising to pay it when it becomes due. In return for this endorsement the bank hands him the original bill of lading, and he gets his goods on arrival. If the bank takes the view that the Englishman is not in a position to pay for the goods it retains the bill of lading and secures the goods for itself, eventually selling them. Of course this very seldom happens, and every business day throughout the year a vast quantity of the world's merchandise is handed over without any actual payment. A bill of exchange on London may be drawn up in South America on goods shipped from New York to Liverpool or Bradford.

The goods may never reach London, but the bill of exchange—that is, the money—must, for London's credit is the best in the world and traders in every part of it have agreed on London as their centre. It is a wonderful thing, and one of which every Englishman should be proud.

I have explained the bill of exchange at length because it plays such an important and vital part in the business of London. The business of the world is done in cheques and credit—not in gold—and as London is not the product of a few days, but the development of centuries, it leads the way.

*Lending
and
borrowing*

Another aspect of London which helps to explain its supremacy is its great lending and borrowing capacity. When New York, Paris, and Berlin fail, London comes to the rescue. The big promoters come to London with their brains teeming with gigantic schemes, and it is in London that they find the necessary money to develop these. British capital maintains Canada, it is responsible for many of the most successful enterprises in the great countries of the world, and invariably the headquarters of the lenders of the money have London for an address. When the United Kingdom wishes to speak to the world or deal with it, London is the mouthpiece and the agent. Weaker nations anxious for more money send to London for it, and if they want money from others they use the influence of London to get it. In this way every year hundreds of millions of pounds are invested by Londoners in the enterprises of the world.

*The home
of insurance*

Life insurance and fire insurance—two of the most vital of commercial enterprises—owe their birth to London. Fire insurance came soon after the Great Fire of London and long before the rest of the world was educated enough to realise its great money-making possibilities. London also developed life insurance. The slow growth of centuries is to-day seen in the perfect organisation and the world-wide integrity of our insurance companies. They have been tested severely along with the insurance companies of other countries, and the result has been to enhance further

their supremacy. Take the great San Francisco earthquake and fire. It is admitted that the London insurance companies, by their liberality and promptness of payment, completely vindicated themselves and proved that their supremacy was no mere paper statement. Other insurance bodies looked for quibbles in contracts, threatened litigation and carried out their threats, some even declined to pay, but London made only the usual inquiries, admitted its claims, and paid on the spot. Something similar happened in the case of the Jamaica earthquake and fire. Where the insurance companies of America, Germany, and France failed, London succeeded. Is it any wonder then that whenever there is a place or a life to be insured London is thought of first. It is our reputation for fair dealing, our hatred of deceit, our honesty of purpose, that have given British trade the hall-mark of security and has gained for it the confidence of the whole world.

Shipping insurance has been London's exclusive property ever since the days when Edward Lloyd gathered information from the sea captains who used to frequent his coffee-house. Merchants of those days met at Lloyd's and transacted business, and from the gossip of the coffee-tavern developed the famous organisation known as 'Lloyd's.' Lloyd's guards the shipping of the world. With its headquarters in London and its agents scattered throughout the world, it daily records the movements of the ships carrying the commerce of the globe. Lloyd's insures ships and cargoes, and when it has undertaken to replace any loss incurred, its agents follow the movements of the ships concerned all round the world until they arrive safely at their destination. Lloyd's, as is well known, is an association of men known as underwriters, and for a ship to be insured its owners must be known on Lloyd's—that is, to one or more of its members. The premium varies according to the stability of the ship, the quality of goods, and the length of the voyage; and several underwriters combine to insure every ship. When the latter happens to be overdue the underwriters offer higher premiums

Importance of Lloyd's

to other underwriters to relieve them of their responsibility. This is the working of the famous organisation that has helped to make London the centre of the shipping trade of the world. The integrity of the members is assured by a deposit of £5000 being required from each, while each underwriter's books are audited yearly by the committee. I mention this in passing just as a reminder as to how things are done in the City of London. This great metropolis, vast and wealthy as it is, could not become the centre of the world in a few years, or even in a century. The establishment of credit is a matter of time, and to gain the confidence of the world requires a test of character and efficiency that is protracted, searching, and rigid.

Lloyd's does not confine its energies and money to insuring ships. You can insure anything on Lloyd's from your son's education to the death of your favourite horse. England—and, therefore, London—created, developed, and retains the supremacy in the insurance business. Again I remark that this is due primarily to the fact that we were the first in the field. All the same, the mere fact that we invented insurance is in itself no reason why we still lead the world. With the universal advance in education and the struggle for existence that is going on everywhere even London could not maintain its great position were it not worthy of it.

*London
fixes
prices*

The fixing of the price of the world's commodities is another of London's prerogatives. When the business pioneers burrow into the interior of Africa or Asia and barter goods for the merchandise of the natives, it is not New York, Paris, or Berlin which settles what the enterprising traders can charge for their goods. London sees to that, for London is the gateway through which the goods of the earth pass, and at that gateway are the men who say what value ivory, diamonds, gold, the newest thing in the way of time-saving machinery, and scores of other articles are worth in black and white. They are the experts who know how to reduce every article o

commerce to figures on a bill of exchange. Again London is indebted to its forefathers, the men who made it.

While all the products of the earth are passing through London very little money is used. Money is only a token; the real money is the actual merchandise. London merchants trust one another with thousands of pounds' worth of goods, for credit is the very life of commerce. The many long-established houses in the metropolis whose histories go to make the history of London are worthy of the confidence and respect of the world. They stand for London, and London stands by them. How often do we hear the proverb, 'The word of an Englishman is as good as his bond.' This is no light saying; it is real solid truth. Every day in the City hundreds of thousands of pounds change hands with no other acknowledgment than a few spoken words. Merchants trust each other; loans are made on the spur of the moment, ratified by word of mouth. There is no time for formal receipts; everybody is too busy.

The supremacy of England upon the seas is reflected in the returns of merchant ships. We own more sea-going craft than all the other countries of the world put together, and so it is not to be wondered at that the metropolis is the greatest of shipping centres. Rivals grow and develop, but London, big as it is, is developing too. Experts maintain that this sea supremacy has arisen out of the perfection of our banking system, and they are right. Without the backing of London's wealth, these thousands of ships could not sail the oceans of the world. Great Britain forms the largest trading centre in the world; it is the biggest business, and, therefore, the ships of the world come to its ports, bringing merchandise and taking it away. And London, as the capital, attracts the majority of the ships, making the tonnage of its port the greatest in the world.

Everything is to be found in London. It is a fact well known in business that the world sends to London when it wants anything in particular. American and continental

firms issue lavish catalogues inviting customers to send for samples or to order the goods. In five cases out of six the merchant has to send to London in order to satisfy the demands of his customers. London is the centre, the very heart of the world's trade.

*The
world's
middle-*

It is a common saying that London is the middleman of the world. In other words, that it does not manufacture—it only sells. This is a mistake, although as middleman the metropolis is unsurpassed. London is a great manufacturing city. Densely populated as it is, and spread over so large an area, its factories and workshops are not so noticeable as the factories of Leeds, Bradford, and other great manufacturing cities, but all the same, London ranks high as a manufacturer, although its supremacy is not due to this. It is significant that many classes of London-made goods carry with them a prestige no other British merchandise enjoy. To the foreign mind London, as the seat of the government and the centre of the Empire's finances, must represent the best, must be, in fact, the best. That is why our manufactures go to the farthest corners of the earth and by their quality help to maintain London's supremacy.

*The
Stock
Exchange*

The London Stock Exchange is another of our institutions which have served for models to less favoured nations. Its procedure and rules have been copied by every other Stock Exchange, and although the younger exchanges are making rapid headway, the prestige and position of London's remain undiminished. Nowadays, Wall Street and the Paris and Berlin Bourses have considerable influence on the finances of the world, but when all is said and done London rules the settling. Crises come and go; there are commercial upheavals, panics, failures, and a thousand other ills to which the business of the world is heir, but the London Stock Exchange emerges untarnished. The reason is simple. The committee of the Stock Exchange require absolute obedience to their rules, honourable dealing is enforced, and every member must meet his obligations, while the rule prohibiting advertising, though



SIR F. VEZLY STRONG, P.C.

Portrait by

Author of the chapter on 'Why London is the Centre'

it may seem conservative and out-of-date, at any rate serves to make foreigners regard membership of the London Stock Exchange something of which to be proud. The New York Exchange man may advertise and, of course, he thinks his British *confrère* ought to do the same, but in his heart he admires that British reserve which enables the Stock Exchange to maintain its hold on the imagination of the people and at the same time earn their confidence and trust..

It is a conglomeration of all these great interests that places London first. When we consider the whole subject it is, indeed, remarkable that in every branch or division of business London is supreme. One might imagine that with the rapid development of the younger nations this great capital of ours might be overtaken and passed in certain departments of human activity, yet such is not the case. As the years go by, London seems to tighten its grip on the world. It continues to draw towards it all the leading man of the earth. And certainly the long start we have had is a tremendous advantage. In the old days London merchants supplied money for the wars of kings, and as the monarchs realised that they could not conduct their expensive military campaigns without the aid of London, the latter grew in importance, slowly realising the truth that money is the sinews of war. The merchants thereupon gained advantages, privileges, and charters for themselves and their city, and in time built up a great and powerful London. When America came into being London had centuries of work and progress behind it; when France, Germany, Russia, and the other nations were developing London was an ancient city. Spain and Portugal had had their day as the principal dealers in the world's merchandise, but Madrid and Lisbon proved unequal to the strain. They had their chance, maintained a sort of supremacy for a time, but eventually had to give way before the great pioneers of England.

There is no need for me to trace the rise of London during its long career. All I am concerned with is its present

*Supreme
in every
branch*

*London's
efficiency*

position. How often are we told that London represents an effete civilisation ; that it is out of date, that its younger rivals are rapidly overhauling it ? These are mere parrot-cries with no justification. The merchants of London, even their very office boys, are the descendants of a long line of workers who form a continuous corporation since the days of King Alfred. The efficiency of London is greater to-day than ever. I maintain that its workers are worthy of the great legacy left them by their predecessors. When the famous Scotsman established the Bank of England towards the end of the seventeenth century he gave London something which is the biggest factor in its success. The Bank of England literally 'taught' the merchants of the world the meaning of money ; it proved to them that the real exchange is not money for goods, but goods for goods, merchandise for merchandise, money acting merely as the appraiser and valuer. o

This question of London's supremacy is a vast one, and books have been written on the subject and are being written, but I think I have touched upon the principal causes of London's supremacy. In a few words, it is London's standing amongst the nations of the world. Other cities are rich, prosperous, progressive, but only London can point to a record unsurpassed for integrity and uprightness. I have already mentioned the fact that London, as the capital, benefits from the exploits of Englishmen from other of its cities, and that is only natural. Great Britain is proud of its metropolis—the richest and most populated in the world. In America they judge cities by their population, for without population no place can progress.

*The poli-
cing of
London*

In conclusion I should like to say something about London's unique organisation—I refer now to its police. Almost every town of importance which has a police force has sent a commission to London to study the working of our own police. I need not quote the many expressions of amazed gratification and wonder the police have earned. In their own way they have helped to keep London in

the front rank. If you study the crime statistics of the other big cities you will appreciate the splendid work done by our own police. It is not that there are too many of them or that they have no difficulties to cope with. I will admit that the average British citizen is a law-abiding person, but for all that I ascribe the success of the police to their innate good sense and discretion. Their control of the most complicated traffic in the world has been the cause of much astonishment to our visitors from abroad, one of whom, who had literally seen all the wonders of the great city, replied to a query as to what he considered the greatest wonder, 'The marvellous manner in which your police deal with the traffic.' We Londoners are apt to take everything for granted. It is only the traveller who appreciates the magnificent organisation, the clean streets, and the numerous privileges that are to be enjoyed in London. The health of London is also a matter for gratification. Compare it with the other capitals and its supremacy is noticeable.

This is where London stands to-day, and I for one do not doubt that its position in the future will be even greater. London, with its resources and its record, can never fall behind in the great race for supremacy, but it behoves those who are entrusted with its destinies to see that they give her of her best. Did England make London, or has London made England? This is a question beyond the sphere of human solution, but it may be felt with complete assurance that for their future prosperity they are interdependent.

THE ESSENTIALS OF BUSINESS FINANCE

The Two Sides : Knowledge of Exact Cost Imperative : The
Danger-Line of Low Prices : Payment of the Workers :
Reserve and Depreciation : Advertising : The 'To-morrow'
Department : Cutting Losses : The Selling Price : Profits :
The Financial Instinct

SIR HAROLD HARMSWORTH, BART.

FINANCIAL DIRECTOR OF THE AMALGAMATED PRESS
LIMITED

THE successful business man usually takes care to let the secret of his success remain a secret—often for the best of reasons. Every business requires individual treatment, and obviously the methods that would prove successful in the building up of a gigantic newspaper enterprise would be unlikely to prove the exact methods essential for the conduct of, let us say, a brush factory.

There are certain general essentials, however, that may be regarded as common to all business manufacturing concerns, and it is with the chief of these that I propose to deal in this short paper.

*The two
sides*

Every business has two sides : the technical or producing side and the financial or business side. It is the first and possibly the greatest of essentials that these two departments should work in perfect harmony and understanding. The finest financial management in the world is sure to fail eventually if the technical side does not perform its duties properly ; whilst, on the other hand, good machinery is not more essential to the success of a manufacturing enterprise than is a thoroughly modern office and factory system with efficient financial administration. A manufacturer may have every machine in his plant of the latest

and most expensive model, but if the system of financial and general administration upon which the business is conducted is antiquated and inefficient the firm will soon be left behind in the industrial race, and will probably meet with disaster eventually.

It is scarcely possible to put too much emphasis on this point. Again and again I have noticed how manufacturers are tending to depend on improved machinery and to neglect improved methods of financial administration and office methods. Far too many large business men, when their enterprises are yielding unsatisfactory results, blame the machinery at their disposal. The common panacea to which the majority of manufacturers seem to fly in such cases is the supply of newer machinery or fresh men, and innumerable businesses have failed because the master expected improved machinery to accomplish a thing that could only be achieved by a sound business system and efficient financial administration.

• The stress of modern competition necessitates that the manufacturer should cut his profits to an almost irreducible minimum, and to do this it is essential that he should know the exact cost of the production of every article he manufactures. The failure to do this exactly is the cardinal weakness of most business systems. No manufacturer nowadays can afford to make mistakes in working out the cost of production of any article, yet it is surprising how few business houses can guarantee their figures with any degree of certainty. When the reader recalls the fact that the price a manufacturer is to receive for an article, and consequently the amount of his profit, depends on the exactness with which he is able to arrive at the cost of production, no further argument will be needed to make plain the importance of this factor in the system of the modern manufacturer.

Knowledge of exact cost imperative

Most shrewd business men have an intuitive knowledge of costs. In the same way that one often finds artists who do their work without having had previous instruction, because of an inherent knowledge of art, so we find many

*The
danger-
line of low
prices*

business men who require no complicated process of cost determination for their own information, as they have the skill to dispose of their wares at a price above the danger-line. They are aware that the danger-line of low prices is there, and by turning every energy to an increase of income rather than to a radical reduction of costs they are successful in doing a fairly lucrative trade. Under the stress of the keenest cutting, however, they are powerless against the man who knows the exact cost of his wares. Whereas the man who relies on his instinct in fixing the lowest price of his commodity naturally relies on a thing that may often mislead him and result in severe financial loss; the systematic man is certain of himself, and knows the exact price beyond which he cannot go.

The failure of most manufacturers to know the exact cost of everything or anything they make is really not a matter for wonder when one considers the great number of factors that have to be considered. In determining the selling price of an article it is not only the cost of material and direct labour that has to be added to profit, but there are all the indirect expenses to be considered as well.

The manufacturer may know exactly the time taken by a certain number of workmen to make a given article, and the cost of the raw material used in the making, but these alone do not constitute the cost of the article. There is all the indirect labour to be paid for. There is the cost of the power employed, a proportion of the heating, lighting, and rental expenses of the premises to be added; taxes, insurance, depreciation, and upkeep of the works and machinery to be considered; and all the selling expenses to be added, including office expenses, salesmen's salaries, cost of advertising, freight, and still many other indirect expenses.

The first cost of anything is its labour cost, and from one point of view the cost of anything is the cumulative cost of the labour spent to produce it from the raw material. Every manufactured product must at one time have been raw material, and has been converted to what it is by the

exercise of labour ; and the more complex the article the greater the cost of the labour that is necessary.

Insomuch as direct labour often constitutes some 50 per cent. of the cost of production of the finished article, and is subject to waste the same as any other factor of costs, it requires no argument to show that one of the essentials of modern business finance is the keeping of the most complete records to show the disposal of every half-penny paid out for labour.

There are various systems of wage-payment, each having its own appeal to the financial administrator of the fortunes of a business, and each having its own peculiar advantages. There is, for instance, the ordinary system of the payment of a regular weekly wage ; then there is the payment of the worker by the number of hours he works—a method that obviously tends to ‘slacking’ on the part of the employee ; there is the piecework system, which would be an ideal one if it were possible to fix exactly the value and difficulty of performing any given piece of work ; the profit-sharing system, whose value varies inversely to the size and importance of the firm adopting it, and which is so capable of manipulation by the administration that many employees seem to distrust it, despite the fact that there are a few firms in this country who employ it successfully. Then there is the American bonus system, which fixes a certain rate of work at which labour earns its reward and pays certain bonuses to workmen who succeed in exceeding these speed limits. A detailed examination of the advantages and disadvantages of these various systems might well be the subject for a book on modern commercial methods, and every employer suits his own particular inclinations as to which he uses.

The allocation of sufficient amounts for reserve and depreciation is a matter of the greatest importance in successful financial administration. The business that is not so strong as its balance-sheet would have it appear is the business that will eventually fail ; the business that is just as strong as its balance-sheet is the one that plods

along steadily in the old grooves ; whilst the business that is going to be a continuous success and improve all the time is the one that is considerably stronger than its balance-sheet reveals.

The value of a plant and buildings at the outset of business is, of course, 100 per cent., but it decreases with the passage of time until its value is gone altogether. Therefore the wise financial administrator makes liberal provision for reserve and depreciation. The cause of the failure of many apparently successful ventures is due to the fact that too large a percentage of the surplus of income over expenditure has been allocated as profit, leaving insufficient margin for depreciation and reserve.

The able financier always considers the contingency of improved methods, processes, equipment, and the like, making his plant, or at any rate a part of it, of no further use. New inventions are constantly being devised for the automatic production of goods with as little labour as possible. The improvement of the product is also one of the most common tendencies of invention, and competition may necessitate the provision of such new machinery at any time. It was one of Mr. Gladstone's wisest sayings that ' Good finance consists more in the spending than in the collecting of revenue ' ; and truly to appreciate the value of a financial administrator it is far safer to examine his allocation of expenditure than the income side of his balance-sheet.

*Adver-
tising*

The exact position of advertising has long been a debatable point in modern business finance. In one sense it may be regarded as a selling expense, and in another as an investment. To the man who desires to dispose of, let us say, a bicycle, advertising is a selling expense pure and simple. He pays his few shillings for so much space in the advertising medium he chooses, disposes of his bicycle, and there is an end of the matter. But when we come to consider the question of publicity as applied to large business houses, the matter is altogether different. In allotting advertising expenses the manager must remember that the seed sown

by an advertising campaign will accelerate trade for a decade—for several decades maybe. A great part of the expense of such advertising therefore is in the nature of an investment. It creates, or helps to create, a valuable asset—goodwill, which may quite possibly be worth more than the whole of the plant. This is especially the case where the goodwill carries with it the right to use some widely known trade mark or trade name.

One of the strongest tendencies of modern financial administration consists in making provision for the future. The 'to-morrow departments' are becoming every year more frequent in large businesses. The old method of comparing this year's results with last year's figures has been extended, and the element of provision and preparation is entering more and more into modern business. It is one of the essentials of modern business finance to anticipate demands and make more preparation for them than is allowed for under the usual reserve and depreciation fund.

In the case of the Amalgamated Press, for instance, thousands of miles of forest land have been acquired in Newfoundland for the purposes of the manufacture of paper both at the present time and in the future. In this the Amalgamated Press does not stand alone, although it was certainly one of the first to realise and make preparation for the future.

The world's railroads consume hundreds of millions of wooden ties every year. One railroad has already planted some 3,000,000 trees or so, and has many others in its nurseries ready for transplantation; whilst a large mill-owner in Holland has purchased several thousand acres of standing timber in Russia to meet the demands of the future.

So it is with chemical concerns. One large chemical company controls some 2000 acres of phosphate lands. Nitrate companies have vast sums invested in the nitrate beds of Chile—property that may not be touched for half a century yet. It is the same with many rubber companies.

They are buying up rubber plantations as fast as they come into the market, and, more significant, are planting fresh trees—more, probably, within the last few years than in the whole century that preceded them.

Many railroad companies have acquired their fuel supplies a half-century in advance of the demand, and a few iron and steel industries have taken the precaution to guarantee their ore-supply for half a century ahead.

That is another of the many essentials of modern business finance, to anticipate the demands of the future.

*Cutting
losses*

There is a certain amount of courage essential to the administrator of the finances of a large business enterprise. Modern competition necessitates the frequent launching out of subsidiary branches in new directions; the manufacturer is constantly bringing out new wares, a publisher new books, papers, and the like. It is impossible always to gauge the public demand for a given article; neither is it possible always to know what sort of a demand can be created. The wise manager is the one who can realise, quickly, when he has made a mistake, and cut his losses. Perseverance is all very well in some things, but it is fatal when applied indefinitely to a losing property.

*The sell-
ing price*

Probably the greatest problem of finance is the fixing of a selling price in relation to the cost of the article and the demand for it. Each several want of humanity is limited, and with every increase in the amount of a thing which a man has, the eagerness of his desire to obtain more diminishes, until it yields place to the desire for some other thing, of which perhaps he hardly thought so long as his more urgent wants were still unsatisfied. This is a sound principle of economics that one must always bear in mind. Every one has at some time or other reasoned with himself something in this style: I have had so much of this that I am not inclined to purchase any more; though, of course, it would be different if it were not so expensive. When our daily paper cost 6d. it was a luxury, but when the enterprise of the manufacturers concerned and the removal of the stamp duty eventually enabled newspapers to be

retailed at a halfpenny, the luxury of yesterday became the necessity of to-day.

Let us take another instance to illustrate another point of the argument. A person while he can purchase tea at, let us say, 1s. 8d. per lb., will probably consume about ten pounds per year. If he could get as much of it as he required for absolutely nothing, he would probably not use more than about thirty pounds a year; whilst, on the other hand, if a corner or a great shortage were to send the price up to 10s. per pound, the probability is that he would turn to cocoa or coffee as his usual beverage, and perhaps only buy a single pound of tea in a year to be consumed as a special luxury.

It must be the aim of the business man to fix his selling *Profits* price so that he gets a maximum of profit on his total sales. A maximum of profit on individual sales is by no means the same thing as a maximum on the whole. Let us return to the example of tea. We will presume that a large merchant is able to purchase a certain brand at an actual cost price of 1s. per pound. If he retails it at 1s. 3d. per pound he finds that his total sales equal 1,200,000 pounds per annum. A profit to him of £15,000. By increasing his selling price to 1s. 6d. per pound his sales would perhaps work out at 750,000 pounds per annum, a profit to him of £18,750. Here it will be seen that he makes a further profit of £3750. By again raising his price to 1s. 9d. per pound his sales would perhaps drop to 400,000 pounds per annum, leaving him a clear profit of £15,000. When he increases his price to 2s. per pound his sales are probably about 150,000 pounds per annum, giving him a profit of £7500; whilst an increase to 5s. per pound should result in a sale of 10,000 pounds, giving a profit of only £2000.

These figures, although purely theoretical, are based on *The financial instinct* good statistics, and serve admirably to illustrate the point of the elasticity of demand which is effected by the alteration of prices. The expert business man must find the price at which his commodity realises for him the greatest net profit; and that is probably the most difficult although

the most essential of all financial attributes. The modern business man must be an expert economist, either by training or by instinct ; he must know his market ; he must take into account changes in the purchasing power of money ; he must allow for changes of fashion, taste, and habit ; he must not be too avaricious, lest he lose all his trade, but, on the other hand, he must not cut his prices overmuch, lest he find that the increase in trade does not nearly balance the loss in individual profits ; but, above all else, he must possess that indefinable quality —the business and financial instinct.

CAN ENGLAND LEARN FROM AMERICA?

Mutual Lessons : The Love of Business : Scientific Supervision : Human Nature : Personality : One British Defect : Shop Assistants Compared : Encouraging Employees : Studying the Customer : ' Mail-Order ' Business : Bringing People to the Shop : The Two Standards : Humanity in the Lump

• BY H. GORDON SELFRIDGE

GOVERNING DIRECTOR OF MESSRS. SELFRIDGE LIMITED

WHILE thoroughly convinced that every country, *Mutual* like every individual, can glean advantageous *lessons* ideas from others, it must not be supposed that I am one of those Americans who think that England has everything to learn from America. Methods vary in different countries, and many ideas which are practicable in the United States would be quite impossible in this country. England certainly can learn from America, and in turn America can acquire an enormous amount of knowledge from England. Americans, like all those young nations, are receptive and are learning all the time. The business men of England will find it worth their while to study not only American, but French and German methods as well.

National temperament is an important factor in business considerations. The American business man works not only to make his living, but also because he rejoices in his work. To him the making of money is a pastime, but his business becomes a passion. He loves business because he regards it as a great game and one worthy of all his time and attention during the working hours of the day. This spirit accounts to a large extent for the fact that thousands of men continue at business long after they have made as much money as they want.

*The love
of busi-
ness*

The building up and the progressive development of a large business is a fascinating thing. Americans love business. That is why they are ready to make experiments and are ever ready to listen to new ideas. Contrast this with the English business man. He is keen, alert, and persevering, but he often lacks the enthusiasm of the American man of business. It may be a question of difference in temperament, but there it is. I should like to see one hundred thousand English business men visit America every year in order to study and learn from the progressive American business man that delightful enthusiasm and real love of doing business which animates him. He would see something quite novel to him—the spectacle of men, young and old, devoting to the serious pursuits of life as much energy and enthusiasm as the British sportsman devotes to games. And in return for this great annual visit I would like to see one hundred thousand Americans come to England every year to learn and acquire that delightful charm of living which is so better understood in this country than anywhere else in the world.

Each nation can learn something from the other. Invention and originality are not the prerogatives of nations; genius owns to no nationality; while honesty and perseverance are universal virtues. I am ever on the look-out for persons who can do things better, and when, as is so often the case, I come across such a man, I try to learn from him, no matter whether he is a German or a Frenchman or an Englishman, or what not. The world is hungry for originality; it wants new ideas. We in our own house of business have studied the methods of the leading business houses on the Continent, in America, and England, and have learnt many valuable things from them all. That should certainly be the best education for a business chief.

*Scientific
super-
vision*

The modern business house requires scientific supervision. Business has been elevated into a science, and in this respect I think some merchants of England can, perhaps, learn something from America. In the United

States they study business just as the student studies his books. There are a thousand and one different ways of developing a progressive business, and only the deepest study can put them into practice. The American business man loves this sort of study; it becomes part of his life, part of himself. Something of the same spirit permeated England fifty years ago. The great merchants of those days were always identified with their establishments. They were not ashamed of their position—on the contrary, they gloried in it. That is the spirit of America to-day. The head of every firm is ever on the look-out for something that will add to his business. New ideas in salesmanship, methods of advertising, original schemes for drawing public attention to his goods, and a hundred other desires are at the back of his brain, and he is ever trying to put them into practice. Business thus becomes something better than the mere bartering of goods across a counter; it is converted into a scientific battle of ability, for the merchant realises that his opponents are just as clever and as untiringly ambitious as he is himself.

• Humanity can be studied at first hand in a big shop. *Human nature* plays a big part in the selling and buying of goods, and the man who cares to study his *clientèle* is the man who eventually pleases them best. Of course it would not be possible to introduce with any chance of success the methods of trading that obtain in certain circles in America. England cannot stand the methods of the showman as applied to business. Women spend the money of England—they do the shopping—and women, although they have a sense of humour, do not care to exercise it while engaged in the very serious business of shopping. They naturally want the best value for their money, and the mere deciding as to what is value and what is not is serious indeed. But the men who conduct the leading businesses in this country might do well to study their customers at first hand. There is a tendency for the chiefs to hide themselves as if they were too great to be seen. Everything is left to subordinates, except when

important decisions have to be made, and even then the judgments must seem vague to the persons most concerned because they proceed from shadows instead of personalities. The American business man is always to the front whether his shop contains ten departments or a hundred.

*Person-
ality*

Personality counts for a great deal in modern business. The mere 'Ltd.' after a firm's name ought not to wipe out the personality of its chief. He ought to be a living force, the representative of the interests of shareholders, employees, and customers. Almost every one of the large business houses in London and throughout the country has been founded by a man unaided by the capital of others. He started a business, gave it his name, and by his name it is known to-day, although in nearly every case a limited liability company has taken the place of the pioneer. It is good for a firm to be known as a certain person's, because it gives it a touch of personality, and also something of a soul, which a mere conglomeration of shareholders never confers. Customers realise that they are dealing with a responsible person who is a court of appeal in all cases of difficulty. Not so with the firm bearing some general title. It lacks personality, and is not that perhaps a handicap?

The truth of this is evident. Run through a list of the leading firms in London—the majority bear names honoured in commerce, and each one represents the story of a struggle on the part of one man who eventually triumphed. Of course in these days many big businesses have their shareholders, for enormous capital is necessary, but that is no reason why they should lose distinctiveness or drop into the category so ably described in the definition of a limited liability company as a body without a soul. Personality is the soul of business. In America, no matter how great a business may be, or how large its capital, there is always a personality at the head of it. And that personality is often the genius, the brain of the business. He is ever a keen-witted, ambitious man, studying hard all the time, proud of his work, and anxious to make his work proud of him.



H. GORDON SELFRIDGE

Langley

Contributor of the chapter 'Can England learn from America?'

In the great development of advertising England and America have progressed side by side, although the methods differ. But there is just one criticism I have to make of English methods. The newspapers certainly lag in emphasising the value of their advertising columns. In America the advertisements are considered by the readers to be an essential part of the paper and often as interesting as the news. In England too much advertisement is regarded as something of a nuisance. This is illogical in my opinion, as advertisements are a vital necessity to every newspaper reader. It must not be supposed that I advocate American advertisements for English newspapers. I know as well as anybody that the quality of advertising which does well in the United States would fail here because it would make no appeal to the English temperament.

From time to time we hear stories of the restlessness of the big advertisers, and we are led to believe that they desire to control the opinions of the newspapers on which they spend their money. Of course neither advertisements nor advertisers should in any way be allowed to interfere with the editorial policy of any paper. They represent a distinct department in themselves, and the advertiser who attempts to meddle with the editor is merely injuring himself. There is no compulsion in advertising—any paper or papers can be selected, but if it ever happened that the advertisers were able to dictate to the editors it would be the worst thing in the world for the advertisers themselves.

The English advertiser would be wise to remember the rule that obtains in the best-managed houses of the United States, 'the goods advertised must be even better than the advertisement.' It may seem a small point, but we have found it very effective.

Undoubtedly the average English shop assistant is far superior to the average American. He seems to me to be of a better type, but what I most appreciate is the invariable good humour, readiness to serve, absence of

*One
British
defect*

*Shop
assistants
compared*

rudeness and brusqueness. This type of assistant is plentiful in England, and, alas! too scarce in America. Our staff, of which I am most proud, is practically entirely British; they are quick to grasp ideas and eager to carry out instructions.

The comparative brusqueness of the American employee may be due to the fact that he occupies a more important position in the scheme of things than his prototype in England. Employers over there study their assistants, and every one of them knows that he or she can rise to almost any position, if efficient. Efficiency is judged by results, and thus the assistants are apt to sacrifice everything to rush and bustle. If the English employer took his assistants more into his confidence, he would get better results. Of late years many English firms have done so, and the idea seems to be making hopeful headway. The days of bad accommodation and insufficient food and wages for shop assistants are gone—that is, in the case of the leading firms. A contented staff means a satisfactory business. The American department store proprietor realised the truth of this long ago and acted upon it. Competition is severe, and to hold his own he must get every ounce of efficiency out of his staff, but at the same time there is none of the methods of the ‘scrap-heaper’ about him. The fact is, he dare not get the best out of a man, and when his brains are exhausted toss him aside for some one younger and fresh. Shop assistants are too much in demand to suffer this sort of treatment, and any firm adopting these tactics would very soon find itself boycotted by the vast army of shop assistants.

*Encouraging
employees.*

Assistants can be made partners without the aid of copartnerships. Instil into them the notion that on their individual efforts depends the success of the business, inspire them to give you of their best, keep them in your confidence, let them know what you are doing, and above all treat them as fellows, and your reward will be great. Here again England has to some extent adopted

the ideas of other countries, but there is much to learn yet. The shop assistant is just as much a part of the business as the managing director, and an inefficient staff will defeat the best efforts of the strongest manager. Leading American houses encourage the staff with promises of higher positions, and consequently better pay, for efficiency. A spirit of competition is aroused, and the result is always good. Too long has the average assistant in England remained possessed of the idea that to do the day's work in the ordinary, conventional manner is all she or he is paid for. That is a mistake. The American idea of the assistant is something of that with which the senior partner regards his junior colleague. They look upon the assistant as a human being and not as a machine.

The study of the customer is obviously of vital importance to the firm which wishes to progress. In America *Studying the customer* they study the customer and what the customer wants. I have referred to the goods sold being better than the advertisement, and the general attitude of the shop towards its customer is a reflex of this. English houses might find it profitable to adopt some of the 'something for nothing' ideas prevalent in America. Over here it is defined as 'throwing a sprat to catch a mackerel,' but I think the American definition more alluring, and certainly more likely to appeal to customers. Every big business in the States is constantly giving this something for nothing. It is not worth much, but it is evidence of an anxiety to please, as well as a desire to express gratitude for the customer's patronage.

The American 'mail order' business is famous throughout the world, and we hear much of it in England and on the Continent. London firms of repute do an increasing mail-order trade, but England has a lot to learn yet in this particular branch of trade. In the first place, it is not generally known that the leading American mail-order houses are not at all retail shops. They do not receive customers for the reason that they have no shops—as the term is understood. They work from warehouses,

and as all their business is transacted by correspondence, they employ assistants whose sole duty it is to make up the orders and despatch them. One American 'mail-order' house did last year a return of £12,000,000, and showed a profit of about £1,500,000 net. No attempt is made to attract customers to their warehouses. That business is left to the retail shops. Of course the mail-order business requires great capital, as it involves constant advertising, and many expensive catalogues, and enormous stocks of merchandise, but it is one of the most remunerative forms of business in the world—when properly developed and managed. I hardly think that it would be worth anybody's trouble to start a mail-order house in England on American lines. To begin with, there are obvious geographical reasons why that particular trade should be successful in America and unsuccessful here. America is a continent, and its population is scattered over a very wide area. Shopping by mail is, therefore, very popular and consequently remunerative; but England, with its compact area and admirable train service covering every part of the country, brings practically everybody within shopping distance of the great emporiums.

*America
invented
the 'follow-
up'*

Every big firm has, of course, many inquiries through the post, and a not inconsiderable business is done with the help of the mails. Once an inquiry comes through the post it is the object of the firm, or at any rate it should be, to make the inquirer a customer. This is an art which America invented, developed, and continues to develop. What is known as the 'follow-up' letter is an American institution, and it is so effective that it would pay well if it were more generally adopted in this country. The ordinary business letter is so stereotyped that it makes no appeal whatever. Now, every letter sent out should be an interesting letter. That is the standard we set before us and judge all letters by. Anybody who takes the trouble to sit down and write a letter of inquiry is paying a compliment that should be repaid by the retailer. It is the good rule that says, 'Take a personal interest

in customers and would-be customers.' And the American business man does so with a thoroughness that is worthy of imitation.

The great scheme in retail business is to bring people *Bringing people to the shop* to the shop. Succeed in this, and the rest is comparatively easy. All advertising has this one object, whether it is by means of newspapers, posters, catalogues, or circulars. When we put Blériot's famous machine—the one that first flew across the Channel—in our house, we did so because at that time Blériot's aeroplane was the most interesting thing in the world, and we knew it would attract thousands of persons to the shop. They would come to see the famous flying machine, and not to see our goods. That did not trouble us. We wanted them to come into our shop, and we could manage the rest. Advertising such as this has its uses. It is distinct, and by reason of its novelty is very effective. In America the flying machine has long since been called in to aid business, and as for wireless telegraphy it is almost out of date now from the point of view of the retailer.

I am no believer in what one may call 'eccentric' advertising. It is all very well in its way occasionally. There is a better way of attracting the public, and that is by selling only the very best. It must not be supposed that American business houses adopt extraordinary advertising methods in order to dispose of second-rate goods. There seems to be an idea in England that any article which is pushed is necessarily lame. But that is a mistake. In this great subject of advertising as done by English and American firms a lot might be said, but I will content myself with the remark that while England has something to learn from America, in turn America could acquire many points from England.

With two such efficient nations as England and the *The two standards* United States carrying on a keen competition for a good part of the world's business, it is only natural to compare methods. Trade has a higher status in America than it has in England, because in the former country money is

more important than birth, and its aristocracy is an aristocracy of business. The American retailer, therefore, enjoys a position often denied to his English rival, but we must not forget that the latter is steadily climbing. Considering that trade is the bulwark of the British Empire, the position of its business men is not so great as it might be. But the tendency in England some time ago was to get away from business as soon as possible, as though it were something not quite respectable. There are notable exceptions, but often, even now, social elevation here means aloofness from business.

It is just the opposite in America. There a man stands or falls by his business. The founders of the great retail houses work hard in their offices long after the necessity for making money has passed away. And it is no mere desire to add to their wealth that induces them to continue their labours. As I have said already, it is a genuine love of the game called 'business.' A devotion such as this must mean progress, and when all one's rivals are of this stamp, the competition is very severe, but the nation benefits. In England the leading businesses seem somewhat detached, almost mysterious. What I mean by this is that there is a tendency to keep the man with ideas, the man with something new, at bay. He is not encouraged—he is not even given an interview. In America anybody who has anything to say is listened to. If the head has not the time, he gets one of his responsible employees to deputise for him. This may mean interviewing hundreds, even thousands, of persons in the course of every year, and, naturally, the majority merely waste time, but if only one produces something that is worth adopting, some article worth putting on the market, a new idea in the art of advertising, or salesmanship, then all the time and trouble is considered worth it.

*Humanity
in the
lump*

These few criticisms indicate where, I think, England and America stand to-day in business. Happily, the retailer is considered an important person nowadays, and he plays a leading part in the development of trade—as

all middlemen must—but with his growth in importance the education of the public is progressing, and they are demanding a better service than they were content with even ten years ago. It behoves every man, therefore, to make himself worthy of the confidence of the English shopper, and there need be no diffidence about learning something new, whether it be from the United States, France, or Germany. Human nature is the same the world over, and when the retailer appeals with success to the human side of his customers, his methods are worth considering, no matter what his nationality may be.

At any rate such has been the philosophy of my business life, and I have never known another one that would have better served me.

THE BUSINESS VALUE OF THE INVENTOR

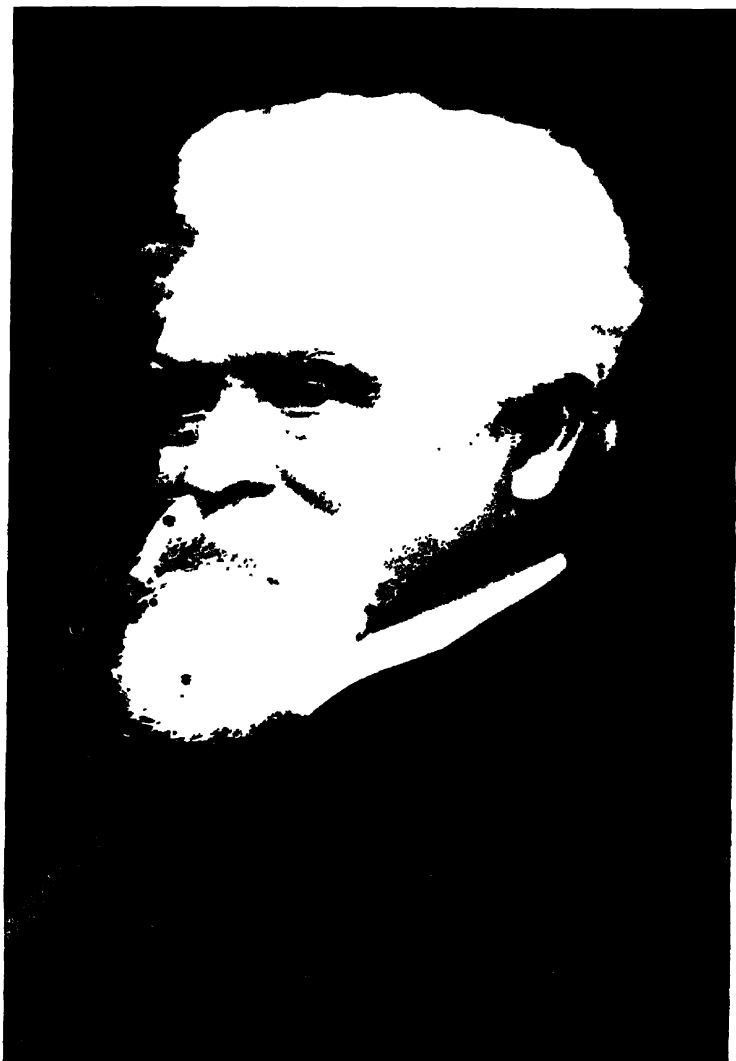
What the World owes to Inventors : Progress and Patents : Evolution of Invention : The Tragedy of Change : The 'Invention Department' : World's Greatest Invention : Bessemer Steel : The Gas-Engine : Electricity : Telegraph and Telephone : The 'Talking Machine' : How I lost a Valuable Invention : The Commercial Factor : Steam-Power and Locomotion : The Flying Machine : Society and the Inventor

By SIR HIRAM S. MAXIM

OF MESSRS. VICKERS, SONS, AND MAXIM LIMITED.

*What the
world owes
to inven-
tors*

I HAD not been very long in the world when I made my first discovery, *i.e.* that practically all of the comforts and luxuries of life and most of the necessities were due to the inventions of some one who had preceded me. I saw that practically everything must have been invented by some one or other, and, after visiting some of the Indian camps, I saw that our modern civilisation was due to our improved appliances and that the many advantages that we have over these Indians was due to the better tools that we had to work with. In discussing this matter with my father, who was a learned philosopher, he gave it as his opinion that it would be impossible to have any degree of civilisation in a very cold country unless mankind was equipped with the tools and instruments necessary to build houses and to till the ground in order to protect himself, his family, and domestic animals over the cold winter. Warm clothing was also necessary, and that woven fabrics were better calculated for the purpose than the skins of animals is witnessed by the fact that the Indians, our neighbours, had given up their skins and were all clothed in woven fabrics. He considered the loom to be one of the most important inventions of mankind, but he



SIR HIRAM MAXIM

Author of "The Business Value of the Inventor"

was inclined to give the first place to the plough. The world, however, is not all agreed on this point, but certainly the invention of the plough has done a great deal for mankind because it has enabled man to get more out of the land than he otherwise could do.

The history of progress is the story of inventions, and the greatest nation of inventors in the world to-day are the Americans. Patent Office records show that the annual number of inventions in America is nearly equal to the sum total of those of Great Britain, France, and Germany put together—the three latter countries coming next to the United States in the order enumerated. One would naturally expect to find, therefore, that the United States is the country that makes the most rapid progress, and fact substantially endorses that idea. *Progress and patents*

It is but a few years ago that Japan sent a special commissioner to the United States for the purpose of investigating the American Patent Laws. When this commissioner was asked by one of the examiners of the Patent Office why Japan needed a patent system, the commissioner made the wise reply: 'I will tell you. You know it is only since Commodore Perry, in 1854, opened the ports of Japan to foreign commerce that the Japanese have been trying to become a great nation, and we have looked about us to see what nations are the greatest, so that we could copy their methods, and we said: "There is the United States, not much more than a hundred years old. What is it that makes the United States such a great nation?" And we investigated, and we found it was patents, and we will have patents.'

In Europe, inventions have by no means been devised in one long steady stream; there have been periods of almost utter stagnation in history when Progress had put her lamp down and slept by the road-side. For instance, between the years 400 and 1600, a period of over a thousand years, there were practically no inventions of any importance to record, except those relating to religious matters—that is to say, the sole inventions appear to have been the necessary

tools and appliances for bringing people to 'the True Faith.'

*Evolution
of inven-
tion*

It was only the very early inhabitants of the earth that dressed in the skins of animals. It was soon realised that something better and more abundant was required, so we find that, very early in the history of the civilised races, clothing was made out of vegetable substances and natural wool. We owe the invention of washable cotton under-clothing to the Arabs: owe perhaps more than we realise to them, for to-day fully three-quarters of mankind is clothed in cotton. The cotton-spinning trade became a monopoly of the spinners of India, but soon the demand far exceeded the supply. Even when England took up the manufacture of cotton goods the supply was still far behind the demand, and so we soon find the attention of most of the men of genius in the world centred on the problem of making cotton goods in a cheaper and more expeditious method. In quick succession came the inventions of the spinning jenny, the power loom, and similar devices, which enabled the English manufacturers to produce cotton goods of greater uniformity and general excellence for ordinary purposes than the Indian product.

*The
tragedy of
change*

At the time that the English manufacturers commenced to export cotton goods and to oust the Indian manufactured article from the markets of the world, there were some seven million people in India engaged in spinning and weaving cotton fabrics. These soon found themselves unable to compete with the power looms of Manchester. Days of poverty and suffering quickly fell on the millions of workers who had been associated with the industry, and it is an established fact that no less than 500,000 of the Indian cotton workers died from starvation in consequence. The value of the inventor to Manchester had a tragic reaction in India. The whole story, however, is not yet told. A number of capitalists and humanitarians became interested in the sad lot of the Indian cotton worker, and soon a quantity of cotton machinery was sent out to India to give the workers there a fresh chance. In this laudable

object the persons concerned were highly successful. The Hindu manufacturers had the raw material on the spot, they had machinery as good as that in the Manchester mills, and their labour was exceedingly cheap, so soon we find the tables again turned. In consequence of the natural advantages they possessed over the manufacturers in Manchester the Hindus soon began to export cotton goods again, and bade fair to capture the whole of the trade in manufactured cotton goods with China--the largest consumers in the world. Again we see the value of the inventor. The offensive instruments of Great Britain being more powerful than those of India our politicians placed an export duty on all cotton goods leaving India. It is scarcely to be wondered that though this stroke of diplomacy was greatly appreciated by the people of Manchester, it was not regarded in quite such a favourable light in India.

The business value of the inventor is now well established. *The 'in-*
Practically every large manufacturing concern of to-day *vention*
maintains, under one name or another, an 'invention *depart-*
department,' employing men who are paid a regular salary *ment*
simply to develop inventions connected with the firm's business. The tendency of the age, in fact, is towards the extermination of the independent inventor in favour of the 'hack' inventor, who is paid a regular salary and expected to turn out inventions for his employers much as a sausage machine would deliver sausages. It is these unknown men who are daily grappling with the minor, everyday, but practical problems of the great manufacturing, who make most of the inventions of immediate commercial value.

It is in fact these minor inventions that yield the best financial results to the inventor. As one looks over the great inventions of the world, and contrasts the fortunes of the really great inventors with those amassed by the minor inventors this fact is borne home with irresistible truth.

In my opinion the greatest invention in the world was *The*
that of Bessemer for making steel. Until quite recently *world's*
the only method of making steel consisted in first converting *greatest*
invention

cast-iron into wrought-iron in a puddling furnace. I should perhaps explain here that cast-iron has a comparatively large percentage of carbon and other impurities; wrought-iron is comparatively free from carbon and impurities; and steel comes midway between the two. Under the old process of making steel the first step was to burn out practically all the carbon in the cast-iron by melting it with iron oxide in a puddling furnace. Having achieved this object—in other words, converted it into malleable iron—it was necessary to add a further supply of carbon in order to make it into steel. This was done by embedding the wrought-iron in powdered charcoal mixed with nitrogenous matter and a little alkali, in a fire-brick box, which was heated to redness for some time. During this treatment the surface of the iron became impregnated to some extent with carbon, and was known as blister steel. It was afterwards rendered more uniform by welding together several bars, and drawing them out while still hot; or else it was broken up, melted, and cast into ingots to make cast-steel. The whole process was expensive, and the product, although well calculated for tool-making, was not suitable for structural purposes. Inventors attempted for a long time to arrest the puddling process when the iron had enough carbon still combined with it to make steel of the requisite hardness.

*Bessemer
steel*

This idea was soon found to be impracticable, as the amount of carbon combined with the iron at any given moment during the process of puddling was quite unknown. Then came the experiments of Bessemer. For a long while he proceeded along the same lines, with the inevitable result that no two batches of steel made by him were alike. It then occurred to Bessemer to burn out all the carbon in the iron by forcing a current of air through it whilst the iron was in a molten state, then when decarbonisation was complete to add some material in which the percentage of carbon was known. Such a material was found in spiegeleisen or ferro-manganese. The addition of this compound to the white-hot wrought-iron in the converter

proved to be the solution of the whole question—a simple solution, perhaps, as one looks backwards, but obviously not so simple to conceive in those days.

The benefits that mankind has received from this invention are beyond computation. It has made fortunes, and it has wrought a complete revolution in the various mechanical crafts. In the making of railroad rails, in bridge-building, in the making of all kinds of machinery it has opened the way for progress and further development that would have been impossible under the previous methods of steel-making. Here then is a truly great invention, yet I think it is doubtful whether Bessemer received as much for his revolutionising discovery as, say, the late Mr. Beecham did for the manufacture of the pills that bear his name.

It was in 1876 that Dr. Otto introduced his 'Silent' *The gas-engine* gas-engine. The value that this invention has already had and is yet likely to have is an extremely difficult matter to decide. It has been the greatest factor in the rapid development of motor-cars and flying machines, and has recently been very successfully applied to the propulsion of vessels of practically all sizes. It is in very extensive use in countries like France, where there are a large number of small workshops, and there is still room for a considerable extension of its uses in that direction.

In financial value, both in itself and as regards its value to the community at large, this is undoubtedly a far greater invention than the pneumatic tyre invented by the late Mr. Dunlop. The latter, however, is a wonderful example of the value of a comparatively minor invention. The total capital of the Dunlop Pneumatic Tyre Company in this country amounts to the enormous total of £2,125,000, and this, of course, is but a fraction of the total capital invested in the innumerable other companies who now compete with the original company in the manufacture of pneumatic tyres and accessories.

In inventions relating to the harnessing of electricity in *Electricity* the service of mankind, the value of the invention has been

inestimable. The discovery of the means of applying that force to the propulsion of trains and trams has had wonderful results, and the amount of capital invested in electrical transportation in the United States to-day has reached figures that are almost incredible.

*Telegraph
and tele-
phone*

I think there is little need for me to emphasise the financial value of the ordinary telegraph and telephone; every one, I think, has heard of the National Telephone Company of Great Britain and the Bell Telephone Company of the United States, the two greatest private companies concerned in the exploitation of the telephone. The fact that the telegraphs have long been under State control, and the telephone also has recently received that distinction, is perhaps the greatest endorsement that could be given as to the business and national value of these far-reaching inventions.

Among the greatest of recent discoveries in the field of electrical research must be reckoned the wireless telegraph perfected by Signor Marconi. It is one of those rare cases where the inventor of a great scheme has achieved the honour and reward that he deserved. During the few years that wireless telegraphy has been a practical part of our civilised life—as distinct from the experimental subject it was before the inventions of Marconi—the system has become one of the greatest safeguards to the safety of those at sea, and it is becoming of ever-increasing value to commercial and social life. Its value to our Navy and Army has already been well tested and found not wanting. As evidence of the enormous business value of this invention it may be mentioned that the capital of the original Marconi's Wireless Telegraphy Company Limited is £750,000, and there are subsidiary companies in the following countries :

Belgium. Incorporated October 26, 1901. Capital, Frs. 600,000.
United States. Incorporated April 16, 1902. Capital, \$6,650,000.
Canada. Incorporated November 1, 1902. Capital, \$5,000,000.
France. Incorporated April 24, 1903. Capital, Frs. 100,000,000.
Argentine. Incorporated August 4, 1906. Capital, \$6,750,000.

In addition to these, agencies have been established in :

Italy (Rome).

Russia (St. Petersburg).

Chile (Valparaiso).

Denmark (Copenhagen).

Norway (Christiania).

Another invention that has been of great value to its *The* inventor is the so-called 'talking machine' invented by *'talking machine'* Mr. T. A. Edison—another of the few really great individual inventors of the old class, as distinct from the modern ones who are almost invariably subsidised by some large manufacturing firm or other. Mr. Edison has made a large fortune for himself by exploiting his innumerable inventions.

• Mr. Edison, by the way, has very definite ideas about inventing as a profession, and the person who has a nebulous idea about becoming a professional inventor would do well to carefully consider his remarks made when he was asked to describe the personal qualifications and the type of mind necessary for an inventor. Mr. Edison said : 'The point in which I am different from most other inventors is that I have, besides the usual inventor's make-up, the bump of practicality as a sort of appendix, the sense of the business money-value of an invention. Oh no ; I didn't have it naturally ; it was pounded into me by some pretty hard knocks. Most inventors who have an idea never stop to think whether their invention will be saleable when they get it made. Unless a man has plenty of money to throw away he will find that making inventions is about the costliest amusement he can find : commercial availability is the first thing to consider.'

All inventors have had some pretty hard knocks at some time or other. The most valuable invention that I have ever made was lost to me completely.

I am the inventor of the process in universal use for *How I lost a valuable invention* standardising the filaments of electric incandescent lamps by heating them electrically in an attenuated atmosphere of hydrocarbon gases. I was the first to apply for a patent on this invention. A patent pirate, named Sawyer,

ridiculed the idea. He could not say enough about the foolishness of the system. When, however, it succeeded, he actually applied for a patent on the process! My patent was months ahead of his, still an interference was declared; Sawyer brought certain of his relatives to swear that he used it more than a year before I did, and the Patent Office decided in his favour. The parties, however, that owned my patents in the United States sought to fight Sawyer with his own weapons, and an inventor was employed who applied for a patent on top of all the others, and made it appear that he invented the process before Sawyer was supposed to have done so. At that time Sawyer, for various reasons, had come into disfavour at the Patent Office, and it proved an easy matter to beat him.

Now it so happened that no one could make an electrical lamp without using this process. A great English judge has said that it was the process that made the electrical incandescent lamp possible. Mr. Edison had to use it; there was no getting out of it, so he engaged some very clever men who had once been in my employ, and took the ground that the patent was common property." He proved that the invention was made by Hiram Maxim; but that I had lost it for the reasons above stated, thus making it common property. The courts agreed with him, and he was able to manufacture incandescent lamps, using my invention.

The commercial factor

There can be no doubt that a tremendous amount of money and labour would be saved if the would-be inventor would distinguish between the mechanical possibilities of an invention and its commercial utility. Though the Patent Office officials see fewer and fewer perpetual motion and similar cranks as the years go by, there are still inventors who patent inventions that are commercially of absolutely no value. One recent instance of this is a hat-tipping device which automatically raises and tips the hat when the wearer bows; another is a mechanical device for putting on overcoats; and another is a device for automatically letting down a latch-key from an upper story at

a predetermined time in the morning to enable the milkman to deposit the milk indoors, the key being automatically raised when the milkman departs. It is but fair to add, however, that such valueless inventions are nowadays so few that they can safely be ignored, and even when the crop of cranks was greatest, which was probably somewhere about the seventies and eighties the waste resulting from their harmless vagaries was infinitesimal compared with the wonderful work wrought by the practical men.

It is not so very long ago that everything depended upon the amount of physical force that could be developed by a man or beast. With the growth of civilisation this was soon found to be insufficient, and so, after a time, attempts were made to harness some of the forces of nature for man's service, and the wind- and water-mill came into existence. These were soon found to be neither sufficiently powerful nor sufficiently reliable for the demands of the time. So it was that eventually a means was found of converting heat energy into dynamic energy suitable for driving machinery, and the steam-engine came into being. This was quickly followed by the invention of steamships and locomotives, thereby completely changing all the old methods of transportation and locomotion.

The year 1824 witnessed the birth in England of the railway system, and at the present day the amount of capital invested in railroad transportation in the United Kingdom closely approaches 1400 million pounds sterling. The amount of capital indirectly interested would greatly exceed that tremendous total.

With the introduction of the 'iron horse' the General Steam Navigation Company arose to champion the adoption of steam-power to the propulsion of vessels. In the prospectus issued by the directors great emphasis was laid on the national benefits that would accrue from the adoption of steam-power, which would enable vessels to enter or leave port quite regardless of wind and tide. At that time there were just 109 steamboats in the United Kingdom, the rest of our overseas trade was being carried on with

sailing vessels, mostly under 500 tons. The credit of having built and engined the first steamship to cross the Atlantic belongs to Canada. The vessel was known as the *Royal William*, and the journey from Pictou, N.S., to Gravesend was accomplished in twenty-two days.

At the present time the steamship companies of the United Kingdom own between 8000 and 9000 vessels of nearly 17 million gross tons.

But neither Stephenson nor Watt probably made one-half the amount out of their invaluable inventions as, say, the inventor of the Ronco Duplicator or the Remington Typewriter.

*The
flying
machine*

The latest of the really great inventions, however, is the flying machine. As an example of scientific ingenuity it is undoubtedly worthy of a very high place, though it cannot be considered as a very valuable machine for commercial purposes.

As a freight- or passenger-carrying machine it is far too uncertain and expensive to compete with the steamship, train, or motor-car; in fact it is difficult to think of any money-making industry in which the flying machine would be of the slightest direct use. For sporting and military purposes, however, there is a great future before it, and there can be no doubt that the flying machine is destined to work a complete revolution in the methods of warfare in the future.

When gunpowder was introduced into Europe, and the possibilities of that substance were realised, it slowly caused a complete change in the methods of warfare. The musket proved itself far and away superior to the bow and arrow or the spear, and with the development of machines of warfare one observes the steady diminution of the number of wars. The introduction of the flying machine has added yet another terror to the warfare of the future. The modern gun can carry about ten miles, but when a town is surrounded by fortifications, as Paris is, for example, it would be very difficult to bring siege guns near enough to do much damage. The flying machine, however, would render

such fortifications absolutely valueless, and one thousand flying machines could be constructed for approximately the same cost as one modern *Dreadnought*. With these located on the French coast it would be possible for the French to bombard London every night with very little risk, and in hazy or foggy weather they could even continue their work of destruction during the day-time.

It would be possible at the present time to produce machines that would be able to carry bombs or other offensive weapons up to about 500 lb. in weight, and it would be possible for an aeroplane to make two journeys from the French coast to London and back in one night, given favourable conditions.

I need scarcely say, therefore, that I am not, at the present time, in favour of a war with France, but the flying machine by the very terrors that it will add to any future war between civilised Powers will doubtless prove of the utmost value to mankind, by the great tendency it will exercise towards putting a stop to war altogether.

In the wars of the past it was the common soldier who was sent into the firing-line to become the target of the enemy. The persons who were responsible for war and who had everything to gain by it were the ones to stay at home in peace and security. When, however, it becomes known that in the wars of the future the emperor's palace will be the first point attacked by the enemy's aeroplanes, that the War Office, the Admiralty, the gasworks, the bridges, the railways, the Stock Exchange, and all the similar institutions will be carefully singled out for destruction, then I think those who are responsible for war will hesitate and avoid the plunge if only in order to preserve their own skins.

So we see that the inventor is, and always has been, of the greatest value to the community. It was the inventor who taught us how to clothe ourselves; it was the inventor who taught us how to live; it was the inventor who showed the way to manufacture; and it was the inventor who devised the means of transporting those manufactures to

*Society
and the
inventor*

other countries. The inventor taught people how to defend themselves, and he has so developed the art of attack and defence as to render warfare a thing almost beyond the consideration of normal minds. It is the inventor who has added to our comfort and our wealth ; in short, it is the inventor chiefly to whom we owe the credit of our rise from barbarism to our present high stage of civilisation ; and the inventor's work is not yet finished—it never will be finished.

TRADERS AND TRADE MARKS

Origin and Modern Development of Branded Goods : Reason for Increase of Branded Trade : Trade Marks, their Advantages and Disadvantages : Usefulness of a Brand : What constitutes a Trade Mark : Brand Names : How to choose a Name : Doctrine of Descriptive Terminology : Disclaimers in Trade-Mark Law : Effective Protection : Dangers of Over-identification : Substitution Evil : Common-Law Rights

BY JOHN MORGAN RICHARDS

MANAGING DIRECTOR OF MESSRS. JOHN MORGAN RICHARDS
AND SONS LIMITED

NO feature of modern commerce is more remarkable than the development of trade in branded products. Every industry has its representatives in the trade-mark register, many of which are totally unknown to the general public. The engineer uses lubricants with a trade mark on the tin, advertised in the technical Press. The manufacturer uses branded materials because he knows that the brand ensures uniform quality. The draper buys piece-goods, sold by him simply as calico, flannel, silk, &c., but bearing on the bolt or wrapping the trade mark of some mill well known in the trade ; the draper knows that he can always rely on thus obtaining goods of the same quality which has satisfied his customers. It is only when a brand or trade mark is advertised in the public Press that consumers ask for the goods—then known as proprietary lines—by name, and the commercial conditions then arising have revolutionised the business of many manufacturing firms.

Brands and trade marks are of some antiquity. The *Origin of brands* smith who hammered out plough-shares or iron spades on the anvil, stamped his name or some device on the metal, partly in joyous pride of craftsmanship, partly in order that

he might not presently be reproached with the bad quality of some rival's output. John the smith, becoming recognised as a trustworthy worker, gained in reputation, and 'John, Smith' on an implement increased its value. The farmer who sent his sides of bacon to the market burned his name on them in the same spirit: and when, presently, the market system developed, and the middleman arrived on the scene, bacon with a specified brand became more saleable, or commanded a higher price. When dishonesty—which is older than some people imagine—devised the misdemeanour of piracy, means had to be found by which a man could be protected in the use of his own brand. The common law was his earliest friend and there is a reported case under James I. where one clothier was sued for putting another's mark on his own inferior wares. There is some doubt, however, whether the plaintiff was here the owner of the pirated mark or a defrauded customer; and in 1742 Lord Hardwicke refused protection to a trade-mark owner on the ground that recognition of such marks 'might lead to a new species of monopoly.' The first reported case where the Court of Chancery granted an injunction for the infringement of a mark was that of *Day v. Day*, 1816, where the mark infringed was a blacking label. False marking was not in itself a crime (apart from any fraud against a purchaser) before the Merchandise Marks Act, 1862. Provision for the registration of trade-marks was made by the Trade Marks Registration Act of 1875.

Early law cases

Benefits of a trade mark

The growth of business in branded goods since the latter date has been continuous, and the speed of this growth has increased steadily. The possession of a brand or trade mark secures to a manufacturer the benefit of demand created through the merits of his own products, whether the reputation of the brand is purely technical or not. Where a commodity is sold by sample and according to market conditions, there will always be a certain fluctuation, quality balancing price. To meet a low market, the producer may let down the quality: and the responsibility rests with the retailer in the case of goods retailed to the

public, and with the buyer in the case of brands on raw materials or implements of manufacture.

But where a brand is attached, the monopoly thus created enables a producer to fix a standard quality and makes him independent of the market. In cotton goods there is no such thing as a fixed wholesale price or standard except where the fabric is, in rare instances, known to the public by its brand. Warehousemen—the middlemen or jobbers of this trade—go from mill to mill, buying what they need at prices which fluctuate with the Liverpool cotton market: a manufacturer may have to sell at a loss, or else keep the goods, when the market in raw cotton is against him, because at a given moment the spinners could obtain raw cotton at a lower price than the price ruling when the goods were made. Something like a revolution was created when a large firm of spinners and mill-owners—The Tootal, Broadhurst Lee Company—advertised white and coloured cotton piece-goods with the trade mark ‘Tobralco.’ Tobralco cottons are sold at one fixed price all the year round, regardless of the Liverpool market, and the public can always buy at one price and in one uniform quality, whereas in unbranded cottons a given price will at different periods represent widely varying standards of merit.

The reason for the great advance in the use of brands and trade marks is that a trade mark is protection without a tariff. The maker of unbranded goods is at the mercy of competition. He can only obtain the lowest price which any one else is willing to accept. In order to meet this competition, there is a constant tendency for him to diminish the quality of his wares, and the retailer of them must rely on his technical skill as a buyer when he decides just how much he can afford to let down the quality of what he hands to his customers. Competition of this character favours factitious products—calicoes laden with a mineral powder known as dressing, which adds to the apparent weight at the time of purchase, but disappears in the wash; silks weighted with salts of tin and with gum arabic to give stiffness and substance which makes a poor silk look like a

*Trade
marks
cure
competi-
tion*

rich one, and the like. The guarantee of quality, furnished by the self-interest of a manufacturer who brands his product, is all to the advantage of the purchaser.

The existing trade-mark laws are conceived in such a spirit of comprehensive fairness that it is difficult to name any commodity of merchandise, manufacture, or discovery that cannot be protected, thus securing every advantage of monopoly and exclusive sale to the fortunate or unfortunate possessor of the right. I say unfortunate as well as fortunate, for the reason that the possession of a trade mark has led many a luckless owner to over-estimate the trade value of his production, and to expend sums of money in vain efforts to popularise it. The same can be said of many patented inventions, which it is common knowledge never reach the point of remunerative value which the inventors anticipated. Thus in trade marks and patents more money has been expended and lost on the whole than profit and gain secured, in endeavours to make known and develop monopolies easily obtained, but illusive and disappointing in their results.

Nevertheless, without a trade mark, it is difficult for any manufacturer to create a business of impregnable value, and manufacturers who have adopted the modern system of standing behind their goods and making themselves responsible to consumers for quality are building up and extending their businesses, while those who neglect the spirit of the times are losing ground and being left behind.

A registrable trade mark must contain or consist of at least one of the following essential particulars :

- (1) The name of a company, individual, or firm represented in a special or particular manner ;
- (2) The signature of the applicant for registration or predecessor in his business ;
- (3) An invented word or invented words ;
- (4) A word or words having no direct reference to the character or quality of the goods, and not being, according to its ordinary signification, a geographical name or a surname ;
- (5) Any other distinctive mark.

The fee is 10s. on application and £1 upon registration,

What constitutes a trade mark



JOHN MORGAN RICHARDS

Who contributes a Chapter on "Traders and Trade Marks"

which lasts fourteen years, and can be renewed in perpetuity for another sovereign for each fourteen years. It will be observed that the right in a trade mark is, unlike that in a patent, perpetual.

This is not the place to discuss the legal and technical aspect of trade marks. It is important when making application for a mark to keep closely to the written law and frame it so as to give one clear title not easily imitated. The late Sir William S. Gilbert suggested that inventors, instead of giving arbitrary or irrational names to their inventions, should enrich the language with rhymes to words which, like 'silver' and 'month,' are at present rhymeless. He added with a certain archness that poets would be liable to give the trade mark valuable free advertising.

There should never be difficulty in inventing a name. *Choosing a name*
But it is not easy to hit upon a title which without being unregistrable under the fourth condition named above, namely, through being directly descriptive, conveys a desirable suggestion. It is obvious that if, while avoiding the strict condition, a word can be made to carry a suggestion with it, the trade mark has increased value. Oxo, Castoria, Autopiano, Bromo-seltzer, Lactopeptine, Bovril, Ivelcon, Wincarnis, Auto-strop, Sanatogen, Frame Food, Thermos, Sanitas, and Benedictine are excellent examples—and it would be difficult to find a happier selection than the trade mark 'John Bull,' lately registered for a line of infants' and other food products. But perhaps the finest trade-mark name ever invented in this category was 'Tabloid,' registered by Messrs. Burroughs, Wellcome & Co. to denote a compressed pellet of a drug or other substance.

This is an ideal trade-mark name: but its usefulness serves to illustrate one of the minor perils of the trade-mark owner. 'Tabloid' has come to be so nearly an integral component of the English language that it is constantly used without any thought of its proprietary character. One hears of tabloid plays, tabloid literature,

*Certain
risks
arise*

and tabloid speeches : and, what is worse, the holder of any compressed tablet of medicine is very liable to speak of it as a 'tabloid,' and consider 'tabloid' the generic designation. This may seem more of an advantage than the contrary. If I go to a chemist, ignorant of the fact that 'Tabloid' is a trade mark, and ask for some tabloids of quinine, I shall pay tribute to Messrs. Burroughs, Wellcome & Co. But, on the other hand, if I have tablets of quinine inferior or adulterated and give them to a visitor, saying, 'You are feverish ; I will give you a tabloid,' he, being dissatisfied with the therapeutic results, may decide that quinine in tabloids is inferior, and thereafter supply himself always with the powdered drug.

The balance of advantage is here probably only one way : but there are cases where loss has been caused through failure on the part of the public to recognise that an arbitrary word was a proprietary and not a generic title. The Orchestrelle Company has advertised player-pianos so extensively that many people regard any player-piano as a Pianola, and consequently attach to any such instrument all the merits justly claimed (no doubt) for the original invention. The Eastman Photographic Materials Company finds it necessary to advertise that a camera is not a Kodak unless made by the Company. Kodak hand-cameras have been in the past, and before their competition was so heavy as it is now, in such universal use that many people speak of any hand-camera as a Kodak. On the other hand, although there are Kodak cameras for 'stand' use, the notion that Kodak means hand-camera deprives them in popular speech of the title. People think that any hand-camera is a Kodak and that no camera is a Kodak except a hand-camera. Many highly inferior photographic implements are sold as hand-cameras, and bad work done with them injures the reputation of the Eastman Company when they are carelessly spoken of as Kodaks. Similarly with the word Vaseline. Not one person in a hundred probably knows that petroleum jelly exists which is not Vaseline, and inferior qualities cast

discredit upon the product of the Chesebrough Manufacturing Company—the original inventors—while large quantities of unbranded petroleum jelly are doubtless purchased under the impression that they are Vaseline. It has sometimes been found necessary by a trade-mark owner to apply to the law for an injunction against the framers of a dictionary wherein a trade-mark name has been entered as a dictionary word. It is not impossible that tolerance of such an entry might operate to deprive a trade-mark owner of his rights.

The owner of a trade mark may desire to incorporate with it words in common use, and he is permitted by the law to do so provided he will expressly disclaim in his application any exclusive right to such added words. To illustrate by example, a manufacturer would not be allowed to register 'Crescent Turkish Bath Soap' unless he would disclaim the exclusive right to each of the words 'Turkish,' 'Bath,' and 'Soap.' But with this disclaimer he would be permitted to register it, provided, of course, that the word 'Crescent,' or the design of a crescent, did not appear in the Trade Marks Register in the same class. There is a danger in the incorporation of descriptive words under disclaimer. Continuing the same example, our soap manufacturer might spend large sums in advertising Crescent Turkish Bath Soap, and thereby create the idea of a special soap for Turkish Bath use. In point of fact, a well-known firm, Messrs. Colgate & Co., do make a Turkish Bath Soap. If they advertised it largely as Colgate's Turkish Bath Soap or Crescent Turkish Bath Soap, it would not be long before competing manufacturers began, with perfect impunity and legality, to make Turkish Bath Soap, which would be sold as a substitute for the advertised product. Effective protection can only be secured by foreseeing the danger of substitution.

This substitution evil is a parasite of the trade in proprietary and trade-marked articles. A manufacturer having created through his advertising and through the merit of his product a large public demand for it, retailers will

Descriptive words dangerous

A parasite of trade

often endeavour, for the sake of larger profits, to take advantage of the demand thus created. It is by no means difficult, without coming within the scope of the law of infringement, to obtain in an imitation a superficial resemblance to a well-known name or trade mark, and to imitate the appearance of the goods covered by it: and when a purchaser comes to the counter asking for the branded article, he is offered the substitute and told that it is 'just as good.' The trade-mark owner loses a sale; and what is worse, as the substitute never is, as pretended, 'just as good,' having no manufacturer's interest behind it, it is likely enough that the purchaser, forgetting that by his own foolishness he allowed himself to be entrapped, lays the blame, not on the factitious substitute, but upon the branded product which he would have obtained had he stood firm.

*Safe-
guards*

The safeguard of the trade-mark owner against this nefarious practice is to be found in the selection of a proper mark. It is a good deal easier to make substitution impossible at the outset than to cure it when it has once set in. The use of descriptive words which cannot, apart from the protected portion of the name, be held as a monopoly, is a grave source of danger, as I indicated in the example of Turkish Bath Soap, shown above. Scott's Emulsion is a much easier name to protect than Scott's Anti-Consumption Emulsion (supposing any such horrible title to have been adopted) would be, because any substitutor who dared to use the name 'Scott's Emulsion' could be instantly restrained and subjected to heavy damages, while anybody could sell 'anti-consumption emulsion' with impunity. There is nothing like a single name for preventing substitution. No one infringes the trade mark of Tabloids without being speedily acquainted with the fact that he is also infringing the law.

As a hint to trade-mark owners, a fact may be mentioned which is not generally known. If I go to a retail shop and ask by its proper trade-mark name for a trade-marked

proprietary article, and if, without informing me, the shopman hands me a substitute, he can be made amenable to a law known as the Law of Passing Off, and in certain cases also to the Merchandise Marks Act. The substitutor must not allow his victim to go away under the impression that he has the genuine article, and in the course of my own experience I have obtained many injunctions against shopkeepers who have practised the substitution evil in this form. The case in which the principle was established was a suit brought at my instance.

The Law of Passing Off amounts to this: that a retailer or other trader (for the same law would apply to wholesale trade too) may not use, for purposes of trade, methods calculated to deceive a purchaser. It is not necessary that the object thus substituted should be one covered by a trade mark. Provided that there is no possible doubt as to a purchaser being deceived in what he obtains, the common law will protect him, and through him the manufacturer who is injured by substitution of this kind. The continuous use of an arbitrary name or form of packing gives protection. The substitutor who wilfully imitates a recognisable form of merchandise, confesses thereby his own intention to deceive, and the Courts are exceedingly scrupulous in looking to the intention in these cases. It is by no means settled law that even unregistrable words, used in connection with a well-known product, do not obtain a certain proprietary character through their constant usage. Much would depend upon the nature of the words. If the words were in any way fanciful, the adoption of them would be a confession of fraudulent intent analogous to the confession implied in a slavish imitation of wrapping. To illustrate by a broad example, it would be impossible to register an anti-fat remedy as a trade mark with the title 'Fat Folk's Friend.' But if any one were foolish enough thus to advertise such a remedy, there is little doubt that the Court of Chancery would grant an injunction against any one else who sold a remedy for the same purpose with that name. It would be argued that there

'Passing-off'
actions

was nothing in the nature of things to require a man to call the article the 'Fat Folk's Friend.' He has all the other words in the English language applicable to remedies for adiposity to choose from, and if he wilfully steals the title adopted by some one else, he confesses his own fraud.

*Personal
names
impreg-
nable*

No stronger or more defensible mark can be adopted than a man's own name in the possessive case, provided no qualifying words are introduced between them. Lipton's Tea, Ross's Ginger Ale, Pears' Soap, Beetham's Pills, Rowntree's Cocoa, Dewar's Whisky, are impregnable. The decisions in the Law Courts have, in every case which I can recall, invariably supported as far as possible the original user of a name against the imitator. The law will not allow another Lipton, Ross, Pears, Beccham, &c., to issue goods bearing names that have become identified with the originator, and even though it were possible to secure the interest of a person bearing the same name, an imitator would not be allowed to take advantage of the accident. It would doubtless be easy for a man named Day and a man named Martin to get together and go into the blacking trade, but they would not be allowed to call their product Day & Martin's Blacking. Doubtless there are chemists named Carter, and doubtless they sell liver pills which are small in size: but they would not be permitted for a single day to call them Carter's Little Liver Pills.

*Trade
marks and
the
public*

Such are a few of the advantages and perils attaching to the sale of branded products. But the advantages far outweigh the dangers, and they are public as well as commercial advantages. Branded goods find favour with the public because the public learns, through experience, that the self-interest of a manufacturer protects the consumer. The branded product is the same wherever found. Having learned that a given article is satisfactory in quality, the consumer can obtain identically the same thing, whether he buys it in London, Edinburgh, St. Petersburg, Bombay, or Shanghai. I mention foreign markets precisely because

it is when a man or a woman is at a distance from the larger marts of the world that standard quality protected by a brand becomes important. The manufacturer of a branded product is under no temptation to meet the market by degrading quality, and he has a very great inducement to sustain the quality, because he will have invested large sums on the faith of his public reputation.

FEELING THE PUBLIC'S PULSE

Anticipation means Success : Don't cater for the 'Fashion' :
Self-Competition : Educating the Public : The Public has no
Sentiment : Value, the One Test : Democracy in Business :
Central and Local Control : Increasing Competition

BY SIR JOSEPH LYONS

MANAGING DIRECTOR OF MESSRS. LYONS LIMITED

*Anticipation
means
success*

THE man who supplies the public's wants from day to day in whatever line of business he may be, will fail if he gives them to-day what they required six months ago. The man who anticipates their wants and supplies them almost before they themselves realise what they wanted—that is the man who will succeed.

The question is how to know what the public want.

In the first place you want a very strong imagination, whether you intend to open a place of amusement or give the public a new restaurant to feed in. Judge the wants of other men in your sphere of life by your own. Or, take any man in the street who is strolling along with his hands in his pockets, say he walks up to a shop window and looks casually in. He sees some article which he half requires—probably he says to himself, 'If that were so-and-so I would buy it!' That man has made a discovery, he has found something that the public want and if he decides to try and supply it, he is on the road to success. He will just be in front of the public demand. There is really no secret about it except watchfulness and clear-headedness.

*Don't
cater for
the
'fashion'*

I mention the latter qualification because the public takes fads and fancies and want to follow what they are pleased to call the 'fashion.' That is never worth catering for. It does not last, and you make no profit by trying to follow it. The real bed-rock taste, especially in food, never



SIR JOSEPH LYONS

Photo Studio

Author of 'How to feel the Public's Pulse'

changes. It has not changed since I started my business years ago ; it will never change unless you can alter the main articles of food.

Take, for instance, the case of the cheaper restaurants. You will notice that the staple food has been the same there since they started, even the catering of the various rival companies is very much the same. You have to give the people a little more luxury, a little better value, a little more for their money as time goes on. But fortunately you cannot change food, there is no substitute for ham or cold beef, or eggs, &c., the city workers always want something plain and solid for their midday meal. The only reason you have to watch is to see that no other firm is providing them with better surroundings or giving them any better value than you are.

It is always quite safe to rely on the public wanting more luxury as time goes on, they are instantly prepared to buy any little new comfort or convenience you can provide. They will wonder, if you bring it forward at the right moment, how they ever did without it. They will think they had always wanted it, though as a matter of fact they had never thought of it.

But don't make the mistake of getting into competition *Self-com-* with yourself—there is no competition as hard as your own. *petition* That is why we built the 'Corner House' and the 'Popular'—they cater for an entirely different class from the 'Trocadero,' and do not, therefore, take away custom from the latter. And that is also why we are going to build a large new hotel in Piccadilly, on the same lines as the Strand Palace, but twice the size. It will bring custom from the more expensive hotels but will not interfere with our own. The Corner House and all similar restaurants are another instance of meeting the public demand—they cater for the middle-class people who want nice little dinners and suppers but cannot pay 'Trocadero' prices for them.

When I started business myself I did so because I knew there were thousands of young men who were being driven into the public-houses for a glass of beer at 2d. just because

a cup of coffee, most uncomfortably served, in unpleasant surroundings, cost them, including a gratuity for the servant, 5d. That sum they could not afford. I knew this from personal experience. I liked tea and coffee, I disliked beer and hated public-houses. I wanted somewhere where it was light and quiet, and where I could read my paper in peace and drink my cup of coffee. Other fellows, some consciously and some unconsciously, wanted the same, but there was no one to supply the want. So they went to the public-houses. Another large section of the public only wanted educating to make them appreciate the advantages of a quiet and comfortable cup of tea.

We determined to give it to them, and ever since then I have tried to keep my hand on the public pulse in the same way and find out what they want before they begin to clamour for it.

*Educating
the public*

Once a man has started to educate the public in what he thinks they want, they will continue to educate him in their progressive requirements. Take Whiteleys or any other big store for example. They started in a very small way with practically only one department, then by degrees customers began to say 'I want some shoes. Can't you get them for me?' Or ladies shopping with their children began to inquire for sporting outfits for their sons at the same place. And so by degrees the public themselves explained what they wanted—told their own symptoms as it were. It was the task of the stores effectively to supply those wants. And it is the same in any other business. Open department after department, give facility after facility—whenever you see a chance of making the public more comfortable. The more comfort you give them, the better you will be able to feel their pulse. It was so in my case. I learned what they wanted, persuaded them to buy it from me, and then I kept faith with them in quality, quantity, and price.

*The public
has no
sentiment*

That you have to do; the buying public is a completely unsentimental mass of humanity. If you give them ninety-nine good dinners and then one bad one, they will forget

the first ninety-nine and remember only the last one. Of that they will carefully tell their friends. If you break faith with them, or if they think you do, trade drops and it is very difficult to pull it up again. Sentimental reasons will never bring a man to your restaurant, only good food at the price he wants to pay will do that.

One always, of course, keeps a light finger resting on the public pulse. For instance, if from any of my branch establishments any special article is ordered in excess, or less of it than usual is ordered, or returned, inquiry is at once set on foot to discover the reason, and if necessary a special visit of inspection paid to the branch. The goods that are to be consumed are bought at 5 A.M. on one morning, and at 9 A.M. the following morning we know exactly what has been sold, what left over, and the exact ratio of profit over expenditure, so that we can tell at a glance the exact patronage the public are giving to every shop and every article. Our system is an elaborate one but it more than pays for itself. Moreover, it keeps the branches in constant touch with headquarters, and that is good for all concerned.

Our first venture as caterers was at the Newcastle-on-Tyne Exhibition in 1897, where we were exceedingly successful. We carried out the plan I have just been outlining, that is, we not only gave the public good food at moderate prices but we gave it to them under more luxurious circumstances than they had ever had it before. We engaged a famous Hungarian violinist and eight other violinists at a salary of £110 a week to play chamber music in our *cafés*; the result was that we were crowded out, and though our only sources of income were buns and cups of coffee, we made a profit. Later on at the Glasgow Exhibition we introduced another little luxury to attract the public, namely, we had a number of pretty Scotch girls, dressed in Marie Stuart costumes, as attendants.

It was at this exhibition that we introduced our rule of no gratuities for the cheaper restaurants. Not only did we feel that the rule added to the dignity and comfort of

the girls in our service but I also knew that it was a correct diagnosis of the public symptoms. I remembered that when I was a young fellow my pennies were very scarce, and if I had to tip the attendants it meant that I had to go without some of my own frugal lunch. We have found the rule a most popular one, and have followed it at our new hotels. At the more expensive places where better-off people congregate such a rule is not, of course, necessary.

We also catered at the Paris Exhibition, and there we learned a good deal of French catering and cooking. Then we began to open up branches as rapidly as we could in London, and we have never looked back.

*Democracy
in busi-
ness*

Our business is, by the way, conducted on the most democratic lines ; I have a staff of over 12,000 people and all our responsible chiefs are men who have risen from the lowest posts. My nephews, of whom I have several in the business, all worked their way up from the bottom, each one of them starting in the kitchen.

No one can feel the public pulse as the chief of a catering business like ours unless he has known the public in every department of the work. You cannot be certain that the waiters are doing their best for the customers' comfort unless you have yourself done the waiter's work.

I have already spoken of our elaborate checking system, in connection with which we immediately ascertain the cause if there is any appreciable falling off in the day's receipts. But if, on the other hand, there is an unexplained increase in the profits or takings, it is equally necessary to at once ascertain the cause. The latter might mean decreased value for the public and therefore unsatisfied customers, which it is naturally to our advantage to prevent.

I am personally strongly in favour of centralised control. This ensures that we are in touch with the public, not in one establishment only, but in every shop that we control. Every rule and regulation of our hundred and fifty branches is identically the same, and has been laid down from headquarters. Even the arrangement of the windows

and of the plates of cakes is the same. We must not take the risk of allowing any one branch to get into competition with the others by different administration.

Of course some local control must be allowed, each manageress, for instance, sends in by a certain hour every day the list of the edibles that she will probably require for the next day, this in turn is passed on to the various supply departments of Cadby Hall. *Central and local control*

We know to a fraction just how far a ham or a quantity of ices should go, and we have a careful checking system to prevent any waste or extravagance. If we did not act on these lines, and did not control from headquarters, we would have to employ a number of skilled manageresses and the cost would necessarily come out of the pockets of the public. A business like this has to be worked on the system of small profits and quick returns.

It is, of course, always worth while to please the public in every possible way, a few sweets, for instance, for children or a flower for a lady will please the recipients out of all proportion to the cost to the firm. But these are mere trifles and do not for a moment compare with the fundamental principle of giving good value for popular prices. The public, after all, come to restaurants to be fed, and they care for nothing else. The fact that peers are dining with you will not in the least affect the ordinary man in the street who wants a good dinner. The public will not pay for their associations, they just pay for solid material value.

Of course there is more competition in my trade than there was, say, twenty years ago, but that there is still room for the enterprising man is shown by the fact that we are all opening new branches and new hotels every day. My own new hotel in Piccadilly will be the largest I have yet opened. But I know there is custom waiting for it. *Increasing competition*

In any case those of us who cater for the public cannot afford to rest on our laurels. The people are always waiting for more,

Once, however, you have got your hand on the public pulse, it will throb responsively, the public will give you plenty of hints as to their symptoms. There is always a way of dealing with public demands. If it can't be found it must be made. The title of this article is really the secret of modern traders' success—the ability to feel the pulse of the public.

KEEPING THE PUBLIC CONFIDENCE

An Honest Deal : Fashions in Everything : Why Advertised
Goods are Cheap : Beware of Change : An Individual Policy :
Study National Traits : Slow Returns : The Magic Chair :
Treatment of Employees : Public Confidence is Goodwill

BY SIR THOMAS DEWAR, M.P.

MANAGING DIRECTOR OF MESSRS. JOHN DEWAR
AND SONS LIMITED

THE successful man of to-day must treat his public ^{An honest deal} honestly as from man to man; in absolutely no other way can he make them his clients. True, public support can sometimes be won by a successful advertising coup, but the buying public are not sentimental, they quickly find out if they are not getting their money's worth, and once a trader loses their confidence practically nothing can win it back. When a man has anything beyond brains to sell, he soon finds out that morality and money-making have to keep pretty closely hand in hand. No matter how much is spent on an article that is not good value—it will never pay. If you succeed in deceiving the public and they resent it, you will find they have long memories. It is a good deal more expensive to reclaim a lost name than to make a new one.

The reason is obvious. Connoisseurs set the fashion everywhere, certain tacitly recognised authorities sit in judgment on the new article, and when their judgment is favourable the public follow them like a flock of sheep. Either for or against you the public moves in a mass. But when once you gain their confidence, as long as the article maintains its value, and provided it is properly advertised and shop-windowed, nothing on earth can put it aside until the appearance of a better article. Equality will not harm it.

*Fashions
in every-
thing*

There is fashion in everything, in food as well as in clothes, and it is at the height of popularity that there is one special danger of losing the public confidence. Competitors will tell your customers that overproduction of an article must necessarily reduce its quality, and as many people believe this, your trade may get some set-back for the moment. That is just the sociological time for you to step forward to give *better* value and to advertise especially well. It is safe to say that with a skilful man at the head of affairs every danger can be turned into a triumph. But don't wait—the opportunity of a lifetime must be seized during the lifetime of the opportunity. And when you have got ahead of your competitor, don't rest, take a long breath, and go on again. Don't take too much advice—keep at your helm and steer your own ship.

Do not copy any one, but establish a policy of your own, and you will find it so much better. Keep the old customers and bring in the new. A business that does not advance must retrograde.

I have, by the way, known on occasion the fixed opinion of the public to have embarrassing results. Last year, in Scotland, the pet Orang-outang of a travelling show died, and as there was no opportunity of giving it a burial it had to be left on the road. Two Scotch gamekeepers found it and carefully examined it. 'Man, Donald,' observed one of them, 'his upper lip iss too big to be a Macpherson, and his lower lip iss too big to be a Macdonald; rin awa' up to the big hoose and see if any o' thae English folk are missing.'

*Why
advertised
goods are
cheap*

It is well known that an advertised commodity is barred by a number of societies in England, and by a still larger number in Scotland. They think that some one has to pay for the advertising, and that that some one is the consumer. As a matter of fact—and this must be kept before the public—the company of an extensively advertised article generally has a large turnover, and therefore can give better value than the firm content with more moderate trade. The trade expenses of a small firm are much larger



SIR THOMAS DEWAR

Mr. Dewar

Who writes on "How to keep the Public Confident"

in the aggregate, because the establishment charges for a large volume of trade are practically the same as for a small, while it is obvious that the man who has a big turnover and comparatively small trading expenses can give the best value to the public.

To keep the confidence of the public you must not make abrupt changes; the public of every country are very suspicious. I have had good proof of this. For example, some years ago in the Malay States circumstances made it necessary for us to change the whole style of the labels on our bottles. Instantly there was a sharp decrease in the orders, and the amount of the shipments fell considerably. I found on investigation that the fall was solely due to the change in the labels. The well-off Chinamen, who were the chief consumers, although they could not read a word of English, knew the label well, and would not be convinced that the contents of the bottle were the same if the label were different. It took many years to regain their confidence; in fact we did not succeed until they had become accustomed to the label. *Beware of change*

It is a most dangerous test of public confidence to in any way alter a label or trade mark to which they have become accustomed. Even if you have gained two or three extra medals at exhibitions, to add them on to your label or trade mark will raise suspicion. This is a curious but undoubted fact.

To copy another man's form of advertising is never successful, and to copy the methods of a man in your own business is simply to advertise your rival's goods. The public always associate certain methods of advertising with certain names.

Map out a policy for yourself, be sure you're right, and then go right ahead. The man who complains that he has never found his level has probably never done his level best. Some men are so busy maintaining their dignity that they never have time to do anything else. *An individual policy*

The confidence of the home markets has the greatest effect on foreign trade, and it is absolutely necessary to

keep London, New York, and Paris well in the front, even if doing so means a financial loss. The travelling public may pass by advertisements in their own country, but it they come to London and get an article there, they think it bears the hall-mark of perfection. An advertisement which he sees in London impresses a New Zealander far more than if he read it in New Zealand. The American public also, when they come to London or Paris, stay long enough to acquire a permanent taste for what they like here, and when they return to America they will ask for it, with the result that the reader of an advertisement in one of the Imperial capitals becomes himself a walking advertisement for the article. Again, an electric sign which attracts a man's attention in New York will be spoken of by him to a hundred men in Sydney. Direct returns may not always show well for Imperial City advertisements, but I know that they come indirectly.

In an even more direct way you can gain the confidence of the provinces by winning the confidence of the cities. Clever advertising will probably induce the fashionable hotel-keepers to take up the article. Now it is a well-known fact that many provincial hotel-keepers go every year to Paris (in particular) to see what the big hotels are doing and using—and very often they go back and do likewise.

*Study
national
traits*

National traits count considerably in keeping the confidence of the public. One has, for instance, to be very careful of the style of advertisement. On one occasion I chose a picture out of the Salon at Rome—it was a picture of some monks drinking—and used it as the subject of an advertisement. All my advertisements came back to me, unused, from Ireland and France. I was told the Roman Catholics of those countries had strongly resented the illustration.

Neither does an inartistic advertisement ever pay, but reproductions by famous artists always do. Not that the general public are probably able to appreciate them, but

they follow the example of the fashion set by the few people who do.

To keep the confidence of the public one must keep persistently before them. 'The man who on his trade relies must either bust or advertise' is sober fact for trading men. It is no use to offer a reward for the return of a lost opportunity. Advertise persistently right from the beginning. Keep at it. Remember that a prophet is no prophet is his own country unless he is an advertising man.

To get the full benefit of public confidence from advertising you should not expect any outward return until the end of the third year—but if you don't get any by the end of the fourth you may take it that your money is lost. You are making some mistake, or your article is not all right. There are two certain ways of losing money: first, to advertise and then leave off; second, to advertise a bad article. Unless you can show an increasing turnover in your business you are not holding the public confidence. *Slow returns* Something is wrong. Investigate.

Methods of winning and holding the public confidence differ in some points. In the former personality counts enormously, in the latter not so much. The personality of the man, his methods, his influence must help to build up the business during all the first year, until, in fact, the business is strong enough to run on its own axle. It is at that stage that the power of organisation comes in. That is the time to look out for good deputies. For when once a business is firmly established, it is the duty of the proprietor never to do anything personally that he can do by deputy. He must have already stamped his individuality on his business; it is now time to stamp it on his deputies. Skilled deputies can do his old work better than he can, he has enough to do in holding the reins of organisation. I say emphatically that the man who writes his own letters when he could get a good deputy for £8 a week to do it for him is not fit to control a large business—and he probably will not control one for long.

The larger the business the less a really competent

director seems to have to do when you visit him. You may take it as a sure sign that the business is not doing well when the principal is concerning himself with details or when he wants to see his callers personally. Sub-departmental heads should be able to attend to all callers. The principal's first object is to avoid them—they are details; his second object is, if they do get in, to get rid of them as quickly as possible.

The magic chair

Personally I carry out this doctrine always, because I have found it pays. I do it by means of a chair which saves me thousands of pounds a year and never hurts my callers' feelings. It's an ordinary-looking study chair, and it is placed opposite a particularly wide writing-table in my room. But the chair is carefully riveted and screwed to the floor. It can't be moved. So that when a particularly long-winded visitor gets to the confidential part of his story and tries to hitch the chair forward to make his point—he comes to an astonished halt when he finds he can't move it. That chair ends the interview more abruptly than any hints from me could do. And it saves me a good deal of valuable time. For real business-like visitors, whom it is easy enough to recognise, there is quite another chair.

I shall probably find more difficulty in getting that chair occupied after this article is published. But I have other time-saving schemes.

These and similar business-getting rules certainly hold the confidence of the business men who understand them—even when they suffer by them.

Treatment of employees

Without in any way approaching politics, I cannot write an article on keeping the public confidence without mentioning the treatment of employees. Leaving morality aside, financially it does not pay to treat them badly or underpay them. The public find it out sooner or later, and it gives the firm a bad name. You cannot continue doing it, for the trade of an unpopular firm does not increase. The public won't buy where they have no confidence. To employ the best men and pay them the best prices is a

paying policy. It brings us back to the old fundamental truth—employees and employers can't get on without each other.

By the way, making a man's personality felt in his business and keeping himself before the public by fantastic advertisements are very different things. I don't believe that any wealthy tradesman ever sold his firm's goods by public exploits of his own. You may sail the finest yacht in the world, you may win the Derby or the Grand National or the Waterloo Cup—but your doing so will never sell 20s. worth of goods. An attempt to win the public confidence by that sort of personal exploitation is worse than hopeless. The public resent any attempt to mix up sport and commerce.

I am so firm a believer in the power of the public will that I am convinced as long as you have the public confidence you can even be independent of the distributors. *Public confidence is good-will* The public will get what they want whether the retailers like it or not. The confidence of the public is the goodwill of the business. Once lose that confidence and the business, even if it be two generations old, is doomed.

There is dangerously little difference in the turnover of a business from a profit basis to a loss. Twenty-five per cent. is just the margin between. To drop £2500, if you have a million turnover, does not seem sufficient to make much difference, but it turns the profit basis of the business into a loss. One can never afford to give up guarding the confidence of the public.

I have already said that personal advertising won't sell goods, but I referred, of course, solely to the business man. The professional man and politician are in a different category. With them the public confidence is bought and held by persistent self-advertisement. The politician with ordinary ability who knows how to advertise himself will sit upon the Treasury Bench long before non-advertising men of far greater ability. One will be considered a statesman and the other merely a politician. The persistent advertising will make all the difference. The politician

holds the public confidence by constantly advertising himself to them. Just as a musical comedy actress who gets her motor accidents and adventures reported *often enough* in the Press—who therefore persistently advertises her play—will have her salary raised by 30 or 40 per cent. It is difficult, perhaps, to say where self-advertisement begins and ends. The Coronation, for instance, was one huge advertisement to show the nation's loyalty and to win the people's confidence for the head of the State. Advertisement is simply the key-note for winning the people's confidence, and providing, as I said before, there is value behind it, in business—political advertising obviously does not require the same hall-mark—it never fails to win and hold the public.

LOOKING AFTER THE WORKER

A Commercial Necessity : Workers' Access to Department
Heads : Advantage of Personal Control : Fair Wages and
Women's Labour : Staff Promotion : Sick Pay : Holidays and
Good Conditions : Fines make Bad Policy : Minimum Wage :
Employers not Philanthropists

BY SIR THOMAS J. LIPTON, Bt., K.C.V.O.

CHAIRMAN OF MESSRS. LIPTON LIMITED

WITHOUT taking a political bias, this is a difficult *A commercial necessity* subject to deal emphatically with. No thoughtful business man doubts the commercial necessity for taking good care of the workpeople. It is on the question of means and methods that we may differ. Personally, I think the problem starts at the time of the engagement of the employees. It is not only the man's ability, but his character—his personality—which matters to the firm. The chief knows the kind of man he likes to have around him—the type he does not like will never have a fair chance of getting on with him and ought not to be engaged ; it is not fair to either side. There is no chance of settling strikes or any other disputes if there is anything in the nature of personal animosity existing between masters and men.

When at all possible, I think the chief ought personally to engage all his men ; I always did this myself until my business was converted into a company. Not only will the practice keep you in personal touch with the staff, but you will know exactly the sort of men with whom you have to deal. The captain of a ship knows his crew both collectively and individually, and that is the best of all plans for the management of men. I believe a man has 25 per cent. more chance of successfully conducting a

business if he knows his staff. Disunited atoms cannot produce a perfect whole. The business can't succeed unless the workers want it to, and you can't know the spirit in which they are working unless you know and are constantly in touch with them. Discontent or disloyalty if discovered in time can be nipped in the bud, but if not discovered in time it may lose a year's profits in its results.

What's good for the masters is good for the men. Every word that I have said applies to both with equal force.

I do not believe in the policy of men working for a great firm, the owners or chiefs of which they never see; it becomes to them little more than a vast piece of machinery.

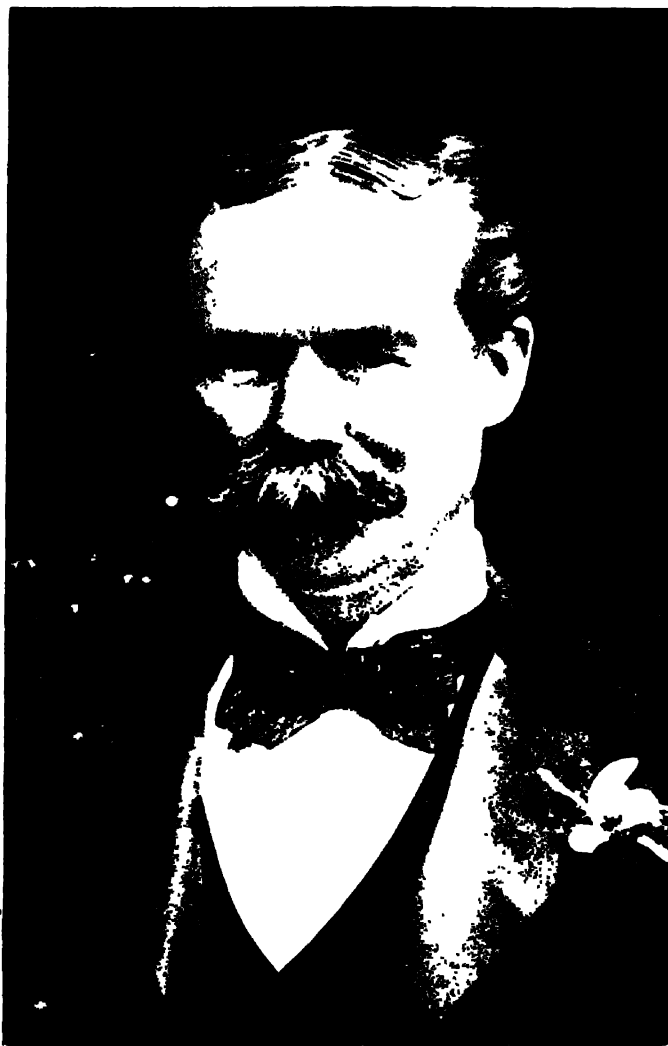
The closer the sympathy between masters and men and the deeper the knowledge of each other the better it is for the ultimate good of the firm.

*Access to
depart-
ment
heads*

I am convinced that there would be no strikes if every worker had the right of direct access to the head of the firm. In the majority of cases the men can only go to their departmental heads. If the complaint is not headed by that gentleman the workman has no further remedy from the firm; he can only, and he does, spread a spirit of discontent amongst his mates. Discontent is a canker that gnaws away the prosperity of the firm.

Departmental chiefs are frequently unsympathetic; they sometimes also get 'swelled head' and are inclined to treat workers as mere 'hands.' They resent the very idea of a 'hand' complaining of the administration in their department, and in some cases they may even penalise the men who persistently bring forward complaints.

This is a frequent source of trouble and there should be a remedy. Naturally the managing director has not time to deal with every trivial grievance; but I suggest that where a man has complained in vain to his sub-chief for consideration of his grievance he should then have the right to appeal to the head of the firm. Very often the grievance is quite imaginary and the right way to deal with it is to take the complainant kindly in hand and show him where he is wrong.



SIR THOMAS LIPTON, BARI
Contributor of the Chapter on 'Looking after the Worker'

During all the years that I personally controlled my workpeople, I never had the slightest difficulty with them or any suggestion of a strike. Invariably I found that the ordinary democratic working people were loyal, true, and conscientious workers. After all, the workers want very little else but decent treatment; they are not unreasonable unless they are driven to become so.

Advantages of personal control

I do not care for the profit-sharing system. I prefer to give the staff good wages, let them know what to expect and make their arrangements accordingly. This I consider is the fairest policy to both sides. On the other hand, I think every encouragement should be given to amusements, clubs, educational schemes, or to any other project for the benefit of the employee and which will tend to make him a better worker both in his own interests and in that of the firm.

Speaking of fair wages raises, of course, the old and difficult question of women's labour, which is so often secured for less money than men's. Personally, I think that wages should be paid independent of sex and entirely according to the ability of the worker, but this is a big reform and one that cannot, unfortunately, be made at once. For women workers I have every sympathy. In many cases girls are working now, and supporting their people, who will never rise to a good position because they were not taught a trade and they are unskilled. Women make splendid workers; they are careful, accurate, and reliable, but they are greatly handicapped by the conditions of trade in this country. It is a pity that the law does not make it compulsory to give every boy and girl a proper business or trade training.

Fair wage and women's labour

An enormous power rests with those in control of workers and the greatest care should be taken in their selection. The policy of promoting the staff is the best one—bringing outsiders in to fill executive positions is scarcely fair to the old hands and generally means trouble. Of course one must except the occasions when it may be necessary or advisable in the best interests of the business to introduce new blood or new ideas into the firm.

Staff promotion

In looking after the workers, promotion is always a difficult question. Even if you go on the principle of choosing the best man, and for that reason pass a younger employee over the head of an older, the staff will in many cases resent it. I think, therefore, that every case of this kind must be dealt with on its merits, but I would not give an unpopular man, or a man whose characteristics do not tend to amicable relations with the workers, a position of authority—it does not pay either morally or financially.

It has been suggested to me that a small committee consisting of employees and one or two of the proprietors should be in existence to consider any vexed question that may spring up, but I do not like the idea. Direct right of access to the responsible chief should be given to the men, and that, it seems to me, meets all claims. Moreover, where a proper spirit of mutual confidence exists between employer and employed nothing else should be necessary.

Sick pay

In giving a large staff of employees sick pay and similar allowances one must remember on the firm's part the competition with which they have to deal, and it is false kindness to look after the employee in any way which may injure the prospects of the firm and ultimately deprive him of his job. Again, this matter depends on circumstances, but there is no second opinion on the point that an employee's post ought to be kept open for him for at least a reasonable period when he is ill. That seems nothing more than common decency.

It is a good sign when one finds the employees openly expressing their liking for the chief ; of course I do not mean fulsome and insincere praise which they fall over each other in their anxiety to give, but genuine expressions of esteem and regard. Nothing sends the firm along faster than friendly comradeship all round.

As few rules as possible should be made for the staff and these few rigorously observed. I don't believe in any beating about the bush, tell the men just what they have to expect from the firm, and let them come or not as they like.

The fact should never be emphasised that masters are one

proportion of the firm and 'hands' are the other. The right spirit to instil into every one is that they are all co-workers for the benefit of the firm and, of course, for the benefit of themselves, inasmuch as the success of the firm means the continuance of their own livelihood. The day is coming when modern labour will refuse to work under the title of 'Masters and Hands.'

I believe in every possible encouragement for the workers, *Holidays and good conditions* from summer excursions to Christmas holidays; and certainly consider that rooms replete with every modern improvement promoting health and efficiency should be provided for them to work in. Good ventilation, good light, and proper heating apparatus for the winter—these things are indispensable.

I do not like the idea of employees 'living in' and should be glad to see it abolished; for one thing, it does away with all possibility of home life, and deprives the workers of the absolute change and freedom which they should have ~~after~~ work. I am even inclined to think that lunch provided on the premises is not altogether good for the workers, who ought to be encouraged to go out into the fresh air for the sake of their own health.

Fines and other little penalties, taken as a rule out of the men's wages, are bad policy. Better to get rid of an unsatisfactory worker than to keep him under such conditions. As a matter of fact, fines deducted out of the workmen's wages are illegal, but it shows the difficulty of dealing with labour questions by Act of Parliament when one notes the number of firms in which men are fined and where employers are either indifferent to or ignorant of the law on the subject. *Fines make bad policy*

It is not possible for any man to lay down general rules for looking after the worker, so much depends on individual cases. I am convinced that if a better understanding and greater intimacy existed between employers and employees the whole problem would be solved.

With the socialistic idea of the equal distribution of wealth I have, as a common-sense business man, no

*Minimum
wage*

sympathy. If that were actually done on Monday morning and every man and woman in the kingdom made equal, how long would the equality last ? Not until evening. We should have to make a redistribution every morning. Temperament, character, and strong will would triumph as they always do triumph in the battle of life. But a decent minimum wage should be fixed for every man and woman. Why wait for Parliament to force us to do justice to our workers ? There is no doubt that workers are determined to have a living wage and the only question is the circumstances in which it shall be obtained.

The reform will mean a great upheaval ; employers will probably dismiss their unskilled workers, but economical conditions will soon right themselves, for skilled labour will no longer be out of employment. When unskilled workers realise that they will not be employed under the new conditions, they will doubtless take steps to obtain the training necessary for a trade. It will ultimately mean a higher standard of workmanship and a higher standard of living all round. The real labour question will be solved when all workers have the chance of living like men and not like slaves.

I certainly do not believe in ‘coddling,’ and think one of the worst services you can do for a friend’s son is to make things too easy for him. Some men make their friends and others expect to be made by their friends. Why should any man or woman who has health and strength want to be helped ? They have not the right spirit of the fighter if they do. Of course there are occasions when the best man in the world will be up against a brick wall ; then by all means give him a helping hand to pull him over. But you generally find that the men who get on are not the men who ask for help.

*Employers
not philan-
thropists*

My opinion is, in a word, that an incompetent worker is not worth employing, that good workers should be well looked after and should have a living wage, and that the employers should be regarded as employers and not as philanthropists. While it is the duty of employers to do

all that lies in their power to improve the conditions of life for their workers, they should not be expected to imperil the success of their business for the sake of their employees, as by so doing they would not only be endangering their own welfare, but that of the workers themselves.

Hard work is inseparable from modern trading conditions and fair play all round is the only motto alike for employers and employees who respect their own good name and reputation. ●

THE DANGER OF OVER-SYSTEMATISING

The Right Use of Business Systems : Eliminating Memory :
Dangers of the System Expert : Systems do not 'work'
Themselves : They must be Simple : As a Check on Men :
Fixing Responsibility : Over-systematised Book-keeping
conceals Facts : How to remedy this Evil : Over-trusting
a System : Time wasted by Needless Systematising

By H. C. BANWELL

EVERY business that is conducted on modern lines requires an arrangement of papers, records, and memoranda which will remove any dependence upon mere memory.

*Eliminat-
ing
memory*

Trusting important details to the memory of any one man or any set of men is dangerous. The man may die, or his mnemonic faculty may decay, or he may resign his position, or be tempted away by a competitor. He may become untrustworthy in other respects, or acquire bad habits which require his removal : and if he alone knows where to find necessary papers, or has been allowed to 'carry in his head' important details, he will have the business at his mercy.

To remove such dangers as this, 'systems'—necessary and useful within their proper limitations—have been devised, whereby any work, for example, which is recurrent is noted on cards in a set of drawers (constituting what is called a card index), which are required to be gone over daily or at other proper intervals and so treated that the work recorded on them cannot be omitted through forgetfulness. As well as this, all sorts of other matters necessary to be recorded are similarly carried in 'systems' of various kinds.

It sometimes happens that 'system' is overdone. The amount of detail introduced exceeds the requirements of

"the case. There are dangers in this. One of the greatest *Dangers of the systems expert* and the one most apt to attack a skilled system-man is that of forgetting that systems exist for the benefit of the business, not the business for the sake of making the system work smoothly. Sometimes if a system-man is allowed too much scope, he will damage the business by exaggerating in his own mind the importance of his work. He makes business subservient to system.

He may also make the system too elaborate for the purposes which it is designed to fulfil: and this gives rise to what is known—not very compendiously—as over-systematising.

The principal danger of over-systematising is the danger that one part of the system will clog the wheels of the rest. Providing for work to be done well and quickly does not ensure that the work *will* be done. The best system is no better than the staff working it. It is not fair to blame the system if the system is not carried out properly: but it is *fair* to blame the system if it creates needless work instead of saving work. Thus a distinction must be drawn between over-systematising and working a system wrongly. The effect, in both cases, is apt to be the same, namely, confusion. But the causes are different.

In any big office, like a Government Department or the office of a large engineering firm, great masses of papers come into existence, and have to be passed from hand to hand. They could not safely be separated. A routine system is devised to take care of them, and sometimes this system gets over-elaborated. The result is that papers sometimes go astray and create serious trouble, because the system has sent them where they are not really required and they get laid aside. According to a writer in *Blackwood's Magazine* there is at least one British Government office which suffers from this effect of over-systematisation.

Certain papers, it seems, wander about within the office, growing in bulk like a rolled snowball. Sometimes they disappear in the course of their passage from desk to desk.

The culprit may be a very great personage indeed : but the papers must be found, or the whole overgrown system would be deranged. So they are put on the 'search list,' and a clerk known as the 'searcher' is brought into requisition. The 'searcher' is an individual whose whole time is spent in finding missing papers. He is an official who has been many years in the office in various departments and knows its routine. He is possessed of considerable astuteness, very great tact, and, above all, indomitable perseverance and bulldog tenacity. With his knowledge of the working and business of the various departments he is able to guess where a missing batch of papers is likely to have gone. Inquiries are made, backed up by polite but persistent demands for the paper or information as to its subsequent perambulations. Firmness, combined with good temper, generally results in the speedy discovery of the missing document. Although wearing work, the duties of 'searcher' are said to have been efficiently performed by the present holder of the post for several years.

It sometimes happens in an office that papers are lost—a fact less difficult to credit in the light of the fact that much larger things than an office *dossier* sometimes go astray. It is well known to every one with any experience of railway administration that trucks, coaches, and even whole trains have been known to get lost in their peregrinations from one line to another, and cannot be traced by the records of the line to which they belong.

*Systems
are not
automatic*

No system works by itself ; though it is often expected to do so until a breakdown shows clearly that a driving force is needed to get work done. For instance, a very large firm of export engineers has a complicated correspondence requiring elaborate cross-indexing. A system expert worked out a filing and card-indexing system, destined to keep them in order, and the necessary cabinets were installed. A large room was required to hold them. But in six months it was found that the confusion was greater than before the arrival of the new system. A thousand

letters had to be waded through before anything could be found. The expert was in disgrace. His protests were unavailing. 'Here have we spent so much on your scheme, and now we are worse off than before!' After a month's futile effort to get things straight, a second expert was called in, and told to overhaul the system and point out its defects. After a day's work the second systematiser handed in his report, which was brief. 'Defects in your system do not exist. It is the correct system for you. What you want is a responsible man to see that the system is properly worked.'

When a senior clerk was put in charge of the filing department, which was thoroughly explained to him, and plainly told that errors and delays would lose him his situation, he quickly pulled the organisation together, and from that time the system worked admirably.

What he had found was that the staff operating the system did not thoroughly understand its details nor appreciate its value.

This shows the necessity for properly training all who may have anything to do with the system. It also shows that the system should not be so complex that it needs an undue amount of training to understand it. However, it makes absolutely certain the fact that the best results can be obtained only when educative measures are introduced with any changes in the conduct of a business. It must always be borne in mind that telling is not teaching. The lesson must be driven home.

The best system is worse than useless unless there is a man whose duty it is to see that it is maintained; and the worse a system works, the more liable it is to lead to over-systematising. Instead of simplifying the old system, checks and complications are introduced in the attempt to remedy it. Every fresh complexity introduces fresh chances of error. But system, properly used, is the life-blood of business.

A system may be so elaborate as to be understood thoroughly only by the man in charge of it. In the case

*Systems
must be
simple*

of his unexpected absence, the system breaks down. In some cases it becomes worse than useless. This is another pitfall for the systematiser, and it needs to be guarded against. A system must be simple enough to be understood by all those who may have anything to do with it.

The physical difficulties of handling money, especially in small sums of metallic coinage, which cannot be traced like bank-notes, give rise to all sorts of over-systematising, in order to prevent speculation and avoid errors in adding and subtracting. It would be an affectation on my part, obviously, not to maintain that mechanical checking of money and mechanism for allotting absolute responsibility to each individual who handles money get rid of all over-systematising of this character. Where every salesman is required to make a mechanically-printed receipt for his customer, and cannot give a receipt without recording the money as due from himself to the cash-box, evidently there is no room either for mistakes or dishonesty. Systems of this kind are now so effective and so simple that they are fast superseding the elaborate pencil-and-paper methods formerly in general use.

*System as
a check on
men*

An important phase of the system expert's work, but one least frequently heard of, is the devising of schemes that automatically check the work of a large staff of executives and provide against delays occurring to inquiries or other matters in hand. Sometimes a small addition to the system may simplify and make efficient what before was cumbersome and unwieldy. The case of a very large and well-known engineering firm in the Midlands illustrates this.

A considerable number of highly-paid technical men were employed in the preparation of tenders for contracts. The work tendered for was generally of a large and important kind, and the preparation of an estimate as a rule was a long and tedious job. Elaborate systems were everywhere employed in handling details: the channel by which (for example) an uncompleted tender-form passed from department to department was clearly marked. But the one

thing was omitted to ensure that a tender-form should always travel along that channel.

The work of compiling tenders was not, of course, the only thing done in that office: but because the handling of tenders gave rise to the greatest trouble, they are taken as an example. A complicated tender would reach the table of a very busy executive. He glanced it over, saw the amount of work required, and put it aside in order to get on with a simpler and more congenial job. This delay would be repeated at another stage, and perhaps again, until it became impossible to complete the tender within the time-limit allowed. Yet the 'system' was perfect—in theory. The mischief of it was that it did not work in practice. Delays and omissions grew more frequent, until a glaring case attracted the attention of one of the heads of the firm, who at once instituted a searching inquiry. Uncompleted work was found in the desk of nearly all of the men who had been trusted to push work through of their own accord.

The partner was both wise and broad-minded. He blamed *Fixing responsibility* nobody but himself for having permitted the system to 'run' itself. He worked out a simple checking scheme, rather like the method by which the General Post Office deals with registered letters. Each tender-form (or other document requiring detailed inquiry) was registered in a log-book, and given a distinctive number. The 'Registry,' run by a single junior clerk, only parted with a 'case' when the recipient gave a signature for it. Each man dealing with that 'case' took care to get a signature from the next man before he gave it up. The registry-clerk kept in his log-book a brief record of the date when it reached him, and of the date by which the office work upon it should be completed, according to the requisition furnished to him in the first instance.

This simplified matters considerably. Certain details could be eliminated: the papers only went to people who had practical work to do upon them. The registry-clerk had to serve reminder-slips upon the men holding cases that

were nearly time-expired : he also had to take his log-book once a week to the head of the firm, for the latter to note what matters were incomplete, and in whose hands they were lying.

These simple steps, joined to the knowledge that the head kept himself informed of the progress of the work, sufficed to put that department upon an entirely businesslike and efficient basis. All that had been done was to provide a means of *fixing responsibility* ; but it was enough to transform a chaotic, inefficient department into an efficient one.

*Men, not
systems*

Fixing responsibility upon men, and not upon a system, should be the aim of the systematiser. Unless the responsibility for the working of the system is fixed upon the staff, the system will not be a success, however elaborately it may seem to provide for all requirements, but some systems enforce responsibility, and soon show the accuracy of the staff operating them.

Many businesses suffer from the fact that the office system does not provide for really vital figures being obtainable except when the books are balanced for yearly or half-yearly stocktaking. This is the commonest of all forms of over-systematising, and occurs just in the places where modern systems do not exist at all : for the right purpose of systematising is to simplify, not complicate, business. Often, in a big concern run on old-fashioned lines, the proprietor cannot really get at what his total liabilities and total assets amount to, except by having a balance-sheet drawn out : and the system of book-keeping is so complex—so over-systematised, in a sense—that a trial balance at some critical moment may be unobtainable, except after so much work that the information comes too late. It is very necessary to maintain a system of double-entry book-keeping, such as will, by the necessity of making the general or private ledger balance, provide a check on the whole accountancy staff : but it is also desirable that generalised statistics on any point shall be obtainable at short notice. For want of such statistics many a firm has become insolvent, and

has traded after it was hopelessly insolvent, with enormous consequent losses to creditors and some scandal. The inaccessibility of general statistics is a result of over-systematising, and a special machine has quite recently been put on the market, for remedying this defect with an economy of labour. Briefly outlined, the principle of it is that every transaction, before being entered at leisure in the books, is registered mechanically in the machine. Every cheque drawn, for instance, has the money-figures printed on it by the machine; every invoice for merchandise bought has the amount stamped on it before it will be passed by the book-keeper for entry in the journal; every sale-invoice is similarly stamped before being entered in the day book; all paying-in slips sent to the bank have to bear their totals, stamped by the machine, as well as the pen total of their items.

A mechanical office register

Each item in each class of transactions is mechanically added by the machine to the previous total of similar transactions, and the total can be inspected, though it is under lock and key, so as to be accessible only to authorised persons. Thus, for example, the proprietor can ascertain his bank balance at any moment by looking at the total of the 'bank deposits' record and deducting from it the total of the 'cheques drawn' record. All his purchases will be totalled, as fast as the invoices are checked in the warehouse, by the 'bought ledger' records, and total liabilities are consequently ascertainable at any moment, with the result that all the vital figures of a balance-sheet can be obtained at a moment's notice. This method also remedies one effect of the over-systematic double-entry system, the complexity of which necessitates slow and careful checking of all arithmetical calculations in book-keeping. As the mechanical additions in the machine must be correct, the book-keepers need not check any of their additions unless the total in the machine differs from them. Great wastes of labour are thus cut out.

The dangers of 'system' lie as much in the direction of over-trusting the system as in over-systematising. For

every system there must be a man who sees that the system is properly administered.

*Don't
over-trust
the system*

But it is all too easy to have too much system. In a busy city office a card system was maintained for years at some cost in clerks' salaries, recording with extraordinary minuteness a synopsis of every letter received by the firm, and every letter sent! When questioned about it the head of the business admitted that it was his own pet scheme, and that the theory with regard to it was that no caller could take him at a disadvantage—he could in a moment turn up his card and see just what business he was doing with him. 'But,' said his questioner, 'your elaborate card system does no more for you—indeed it does rather less—than any decent modern filing system would do. And a single office-boy could keep the filing system going.' Even when this was clearly explained to him, it took that business man a long time to persuade himself to drop the system of his own invention.

Over-elaboration of works-costing systems is responsible for a great loss of time, particularly in the manufacture or construction of supplies for heavy and civil engineering. This work involves the manufacture of a number of parts, the assembling of these parts into wholes: these wholes, in turn, being but parts of the finished article, to be assembled in a place perhaps remote from the works. Such work requires very careful systematising. 'Costs' need to be recorded with accuracy at every stage. But care must be taken lest the costing system becomes in itself so important a job that it takes up more time than it is worth.

*Danger of
form-
letters*

Some mail-order businesses suffer from a totally different effect of over-systematisation. In corresponding with customers, it naturally occurs that the numerous letters received, and replies sent, are of the same tenor. It is soon found that a special letter need not be dictated for each, since they are nearly all alike: so a 'form-book' is prepared, containing the form of reply to each sort of letter received. In dealing with the correspondence the mail-order corre-

spontent simply gives the distinctive number of the reply to be sent in each case.

This system introduces a temptation to make form-letters serve for *all* correspondence. The man in charge saves himself the trouble of dictating special letters. But replies that are obviously machine-made cannot always meet the case and are apt to offend a customer who perceives that he is not getting real personal attention. The customer complains, gets another stereotyped letter, and then purchases elsewhere. The system was carried too far.

The mail-order correspondent should strive to make his letters appear as personal as possible in each case; and the form-book system is dangerous in the ease with which it conduces to the avoidance of special dictation. The mail-order man should, in most businesses, try to dictate as many special letters as possible; but the form-book system aids him in writing as few as possible.

Special circumstances, necessitating unusual treatment, *Allow for special cases* frequently arise in businesses of every kind: and a system that makes no allowance for special cases becomes so much red tape, clogging the machinery and preventing progress. A large office needs not only a man to see that the rules are observed: it also needs a man to decide when the rules are to be set aside. The systematised office that has no man always present who is able to break the rules with good judgment is without doubt *over*-systematised. A system elaborated so as to deal automatically with every conceivable condition would be over-elaborated. Systems are—or should be—invented to meet the requirements of the average work of the office; and the work that is new and different, ~~and~~ does not readily fit in with the office routine, is just the work that should come to the notice of the head, because it is important. It is important because it *is* new.

For instance, an order might be received in the ordinary way of trade for ordinary goods, but with a proviso that they be finished, or packed in a special way. A properly systematised office would bring that order to the notice of the head, who might get from it a hint of new uses, or new

markets, for his goods. An over-systematised office would work it all off without allowing it to attract this amount of attention, and the benefit would be lost.

The purpose of system is to *facilitate* dealing with work, not to hamper work : and the aim of the systematiser should always be, as already indicated, to subordinate the system to the work to be done, and make it meet average requirements. A system cannot be expected to take care of everything, or it would be cumbersome ; or to take care of itself, for that would lead to confusion.

**FACTORY ORGANI-
SATION AND
MANAGEMENT
By J. W. STANNARD**

AUTHOR'S PREFACE

THE remarkable changes that have taken place in commercial conditions during the last century have created new conditions in manufacturing that demand modernised methods of control. Manufacturers, bringing to their aid the best scientific knowledge, and combining not only nationally, but internationally, in order to increase the general efficiency of their respective industries, have changed the whole face of commerce; and, by means of the pressure of competition, are rapidly bringing every civilised nation into line with the modern applications of scientific principles to business management and manufacturing processes.

A continuous professional experience, extending over many years, has shown the writer the main weakness in the manufacturing literature at the command of the manufacturer. Numerous works of an excellent technical character are in existence, which deal with problems of manufacturing organisation; and to these must be added a number of publications designed to record modern developments in business conditions. The majority of these writings suffer from what has been proved to be a serious defect. In nearly every case they deal solely with the application of modern principles to specific conditions.

Unfortunately for the manufacturer who has only such literature to turn to, businesses have never yet been standardised; and it is generally found that while a principle can be applied in one way to one business, it must be applied in a totally different way to meet the requirements of another business of the same class.

As a consequence, such literature is only of service to the manufacturer who is fully educated in the basic principles that underlie all methods of business control and management; since, without such knowledge, he must fail to understand the applications of the principles set out.

In the present volume much material of a purely elementary nature has been included, because the writer, from practical experience, has found that the majority of manufacturers have only a vague idea of even the most elementary principles of business organisation. That they manage to apply many of these principles to their own businesses is no criterion of their knowledge in this respect, as much of

this is the result of intuition rather than of knowledge, and, in some cases, is merely the application of a known method that has a fairly general range of applicability.

In order to bring this work within the scope of all manufacturing businesses, it has, in consequence, been designed on a different plan from that generally adopted. In the first section the basic principles of industrial organisation are reviewed, so as to impart a general knowledge of the foundation on which modern organisation is built. In the second section these are illustrated with recent applications of modern methods of organisation, taken from actual systems in use in various classes of business, both at home and abroad.

It is hoped by this means to induce a more thorough investigation of the general principles of industrial organisation by the British manufacturer; and while the space at the writer's disposal has been exceedingly limited, considering the enormous range of the subject dealt with, a great object will have been achieved if the present work leads to a more careful consideration of the scientific aspect of manufacturing, both by manufacturers and technical writers.

The author acknowledges with thanks the assistance rendered by the firms referred to below, who have supplied original forms, photographs, or records for use as illustrations; as also the helpful advice of Professor H. Stanley Jevons, M.A., B.Sc., F.S.S., whose scientific investigations into industrial questions are so well known, and Mr. John Mann, jun., M.A., C.A., one of our premier accountants, and author of the factory accounting section of 'The Encyclopædia of Accounting,' who have reviewed 'Factory Organisation and Management' in proof form.

J. W. STANNARD

Messrs. D. NAPIER & SON, Acton Vale, London, W.

Messrs. HERBERT MORRIS & BASTERT LTD., Empress Works, Loughborough.

Messrs. MATTHEWS & YATES, Cyclone Works, Swindon.

Messrs. ALLEY & McLELLAN, LTD., Sentinel Works, Glasgow.

Messrs. LA SOCIÉTÉ LORRAINE DE DIETRICH DE LUNÉVILLE, Argenteuil, near Paris.

Messrs. JEANCARD FILS, Cannes, France.

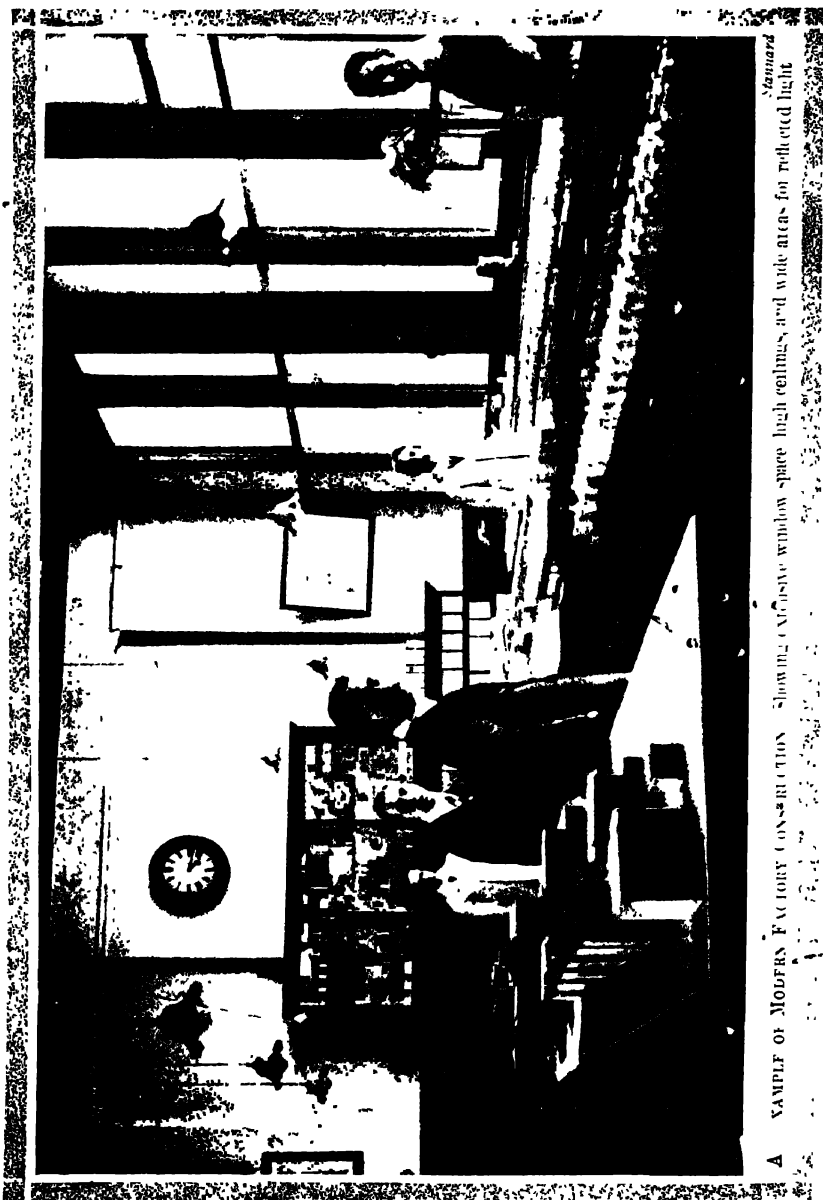
Messrs. RYFF & Co., Bern, Switzerland.

Messrs. LOUIS BRANDT & FRÈRE, Bienne, Switzerland.

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Messrs. THE COLUMBIA PHONOGRAPH Co., Bendon Valley, London, S.W.

Messrs. T. ROBERTS & Co., Portland Shoe Works, Leicester.



General

A SAMPLE OF MODERN FACTORY CONSTRUCTION. Showing extensive window space, high ceilings, and wide areas for reflected light.

CHAPTER I

INTRODUCTORY

Modern Organisation : The Advantages of Proper Organisation : Organised Management—What it means, What it is, and What it does

MODERN manufacturing organisation is a product of the rapid development of industrial activities during the past century. This development has been more pronounced in some countries than in others, and has affected certain industries more than the rest. Reflex influences, however, through international competition on the one hand and the demands of organised industry for better service from its suppliers on the other, have had the effect of bringing literally every industry in every civilised country under the influence of modern industrial conditions. *The influence of organisation*

Patent rights of a German machine that cuts a farthing a yard off the cost of a textile product find a prompt market in competing countries. Methods that have developed successful businesses in America rapidly find favour in Great Britain. Following close on the heels of the inventor of machinery has been the inventor of commercial methods—the machinery of business control—both continually striving to improve manufacturing methods in their own particular field. In the past, when competition was less keen, and manufacturers were content to leave demand to develop their businesses, big profits were the rule, and variations in production costs affected the final balance-sheets but little.

To-day, through the influence of widespread competing influences, supply takes the lead and anticipates demand; profits are low and the cost of production high; and manufacturing conditions demand that a manufacturer shall be prepared not only to meet, but to *create* a demand for his productions, and at the same time sell at a price that hundreds or thousands of competitors cannot profitably underquote. Machinery and the gradual reduction

in the production cost of all classes of manufactured goods have had their influences on prices, and as price reduction comes first out of profits, manufacturers of all kinds have had to look to their cost of production for a saving that would compensate for the loss on selling price.

The necessity for organisation

Thus has arisen the necessity for close analysis of the elements of manufacturing cost, and for organising the controlling forces of the factory so that waste of either time, labour, material, or capital may be reduced to a minimum. Competition having created a dead-line beyond which selling price may not pass, the producer has to aim at keeping his expenditure as far behind that line as possible, so as to show a margin of profit. To do this he must use improved machinery that will reduce his labour cost. He must extend his buying operations so as to take advantage of the cheapest markets for his raw material. And he must so plan his records that they will keep him constantly informed of his progress, and of any weaknesses or losses that may be developing in his business.

This latter is as necessary as that he should keep abreast of his competitors with his machinery. But because machines are visible workers, the productive value of which can be seen and readily understood, while the results from improved handling methods, whether of men, material, or records, are cumulative, and greatly dependent on the ability of the men who develop and handle them, interest has centred far more on the machinery that can make goods than on the machinery that merely handles the details and records of their manufacture. This is not altogether because the value of the machinery of organisation is not demonstrable, but because of a widespread lack of knowledge of the vital principles of organisation, which prevents manufacturers from understanding applications of them which are presented for their consideration.

A typical experience

No better instance of this point can be quoted than the experience of a well-known British manufacturer. This man has built up one of the biggest businesses of its kind from a single-roomed office. He is an expert on manufacturing processes, and open-minded to a degree on any point concerning business development. In his office he has a library of books on manufacturing organisation, and, in addition, has collected from every available source, notes on the methods of other firms that have proved successful, and which he thought he could apply

to his own business. Yet, in spite of this, he failed to get his business into a condition that satisfied him.

One day he met a manufacturing expert, and had an interesting discussion with him on purely manufacturing principles, in which his own business was not concerned. In his own words, that conversation let more light into his business in an hour than he had seen in twenty years, and he proceeded to analyse his business from the point of view of the principles of manufacturing organisation in the same way as an engineer would apply engineering principles to the examination of a power plant. In nearly every department he found he was working on wrong lines; and, working alone, on his little knowledge, and in opposition to the wishes of his fellow-directors and the firm's accountants, he managed, after twelve months' hard work, eventually to apply the principles he had learnt to his own organisation.

The result surprised everybody concerned, for at the end of the first financial year after the change, the firm found that on manufacturing alone they had made the biggest turnover in their history, on fifteen per cent. less labour cost than their previous best year. In addition, sales had been made at better all-round prices than ever before; and instead of a normal balance, the business had made a handsome profit. This illustrates one most important point in the consideration of the problems of manufacturing organisation, viz. that it is the application of basic principles to the requirements of each individual business that succeeds, and not the adoption of methods merely on account of their success in other businesses.

This is the foundation of all efficiency in the organisation of a business, just as the application of mechanical principles is the foundation of the efficiency of a properly constructed machine. Built on this basis, a manufacturing organisation will provide a continuous knowledge of progress down to the smallest detail of importance; it will help to eradicate waste, by keeping always before the notice of the executives the fluctuations in the creation of waste; it will detect leakages of time, labour, or material through inefficient workmen or wrong methods of management; and it will concentrate a complete and perfect control over details in the hands of the chief executive. In addition, an efficient organisation will create a power of commercial foresight that will enable a business to plan its work and its management to the best advantage, thus reducing the

The foundation of efficiency

risks inseparable from the management of a big undertaking.

Many firms, keen and active in their attentions to modern developments in machinery and manufacturing processes, are still content to depend on an antiquated system of management and control. So long as the balance-sheet shows a dividend, and competing influences have not cut out the whole of their profits, they pay little or no attention to the losses, whether of money or opportunities, that an inefficient organisation conceals. Success, however, is not to be judged by what a business is doing, but by what it *might* do; and the constant goal of every undertaking that hopes for permanence in the face of any competition is a permanent and continuous *efficiency*.

*What
America
has done*

America has raised business efficiency to the level of the sciences. It has its own University professors, and a business course is included in the curriculum of most of the big colleges and schools. But it has been the *fetish* of hundreds of its most prominent exponents, and led them into a species of self-hypnotism, that gave every new development and every novel idea a perfect form whatever its weaknesses.

America approached the problem of business efficiency from a totally different point from that of Great Britain. Once the idea caught root, it rapidly developed into a craze, during which inventors of all kinds of systems and appliances reaped a golden harvest. American manufacturing businesses of all kinds loaded themselves up to their utmost capacity with new systems, and with patented time- and labour-saving appliances, paying, in addition, fabulous fees to manufacturing experts for advice.

But before many years had passed, they found that the craze for business organisation had grown so quickly that it had overreached itself. While before they had been losing too much through inefficiency, they were then spending too much to *gain* efficiency. Retrenchment became the order of the day, and gradually the wasteful expenditures were cut out, while from the mass of systems and methods the useless and over-costly were weeded out until only the useful and efficient remained.

Yet in spite of the enormous waste in money and time this craze entailed, it gave a fillip to American industry that has kept it ahead of the world. Through the knowledge gained from better organisation, the American manufacturer was able to cut production costs to a mini-

mum, and, in spite of a high labour expense, to compete with the world for international business. Scientific manufacturing and marketing of product soon told its tale on the world's markets, and gave to American goods a reputation for value, and to American firms a reputation for efficiency, that have brought them enormously increased business.

The British method of approaching the question has been from the bottom. Careful, doubting, and often unapproachable, the British manufacturer learned little of what was happening in other parts of the world. Proved efficiency of methods was generally his only point of view regarding a change in his organisation, even if he did not actually refuse to consider anything that would interfere with the methods that had successfully carried his business over half a century or more. The pressure of competition, national and international, however, made itself felt in course of time, and gradually British industry is raising itself to the efficiency standards that competing businesses and competing countries have set.

Given equivalent efficiency in organisation, coupled with the British reputation for quality and workmanship, few, if any, countries could compete with Great Britain; but it is doubtful whether the country will wake up in time to save its best business, and will realise that the day of the old-time business has passed, and that only modernised factories, built and managed on principles of business efficiency, can hope for continued success in the face of modern scientific competition. This book is written especially for the British manufacturer in order to bring before him, in a simple, comprehensive manner, the basic principles of organised management, as applied both at home and abroad, so that he may himself apply these principles to his own business and thus bring it in line with modern industrial methods.

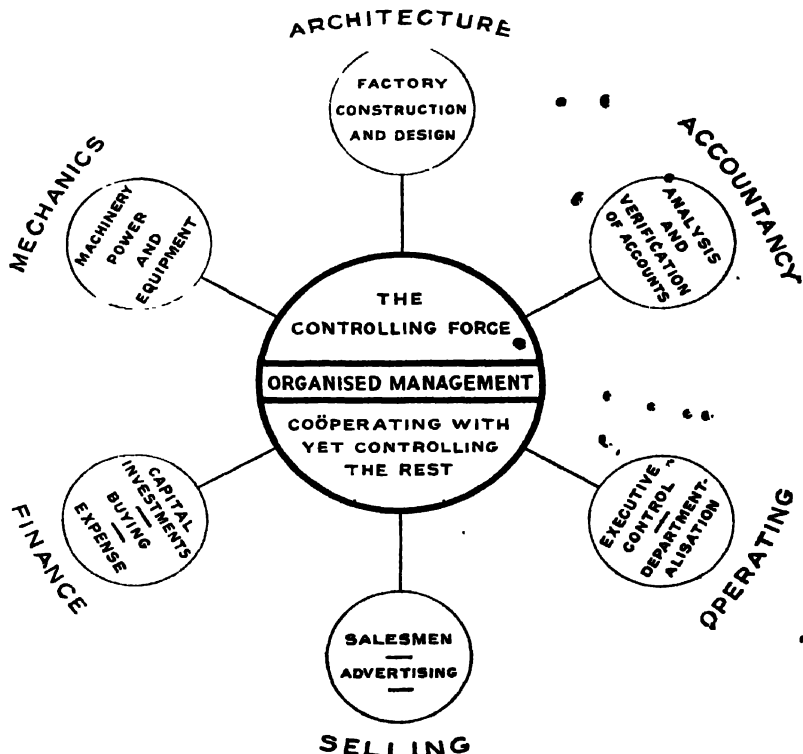
Organised management means, literally, perfectly designed machinery of business control. It is not a question of accounting, or of the application of accounting principles. Accountancy, as practised, fails to touch the vital problems of organised management. Scarcely one accountant in a thousand has anything but a remote idea of the principles underlying but a single feature of the problem—manufacturing costs—an important section, though but one of the many. Apart altogether from lack of experience, this is but a natural position of affairs. Accountancy

*British
point of
view*

*What
organised
manage-
ment is*

follows on the work of organised management, checking, and reviewing its results. It deals with final results, while an efficient organisation takes care of the details as they occur.

The great weakness of many organisations is caused by the fact that they are merely appendages of and develop-



No one section of a business should control or unduly influence its operation. Organised management should always be the main controlling force, to which all sections should be subservient

ments from their accounting systems, instead of the reverse being the case. They have, in fact, been built downwards, instead of from a solid foundation upwards. The constructive details of a sound manufacturing organisation begin from the laying of the first stone of the building

and reach to the delivery of the finished product. They cover a thousand and one details with which accountancy is in no way concerned.

So far as they affect finance, accountancy principles may reflect their influence down into the manufacturing organisation, just as architectural principles must affect the erection of the factory buildings. But architecture, accountancy, mechanics, lighting, power, and all the individual principles concerned in details of manufacture and its requirements must co-operate with and be subservient to the principles of organised management if the business is to achieve the fullest measure of success.

Efficient organisation is the switchboard of the business —the controlling force in the daily work of the plant. *The business switch-board* It provides the indicators that enable the executive to keep in touch with the working of every section, and show immediately when any detail has gone wrong. Just as the chief engineer can stand at the switchboard of a huge electric power plant, and direct with unerring accuracy the handling of tremendous amounts of electrical energy over hundreds of square miles of territory, so the executive of a big manufacturing business can sit at his desk and by means of his indicators direct the operations of thousands of workmen and the handling of the work of an enormous plant, while keeping in touch at the same time with every important detail that goes wrong. The same applies quite as much to the small manufacturer as to the large one.

One prolific cause of failure to apply organisation principles to the small business has been the endeavour to adapt the machinery of larger businesses to the requirements of small ones. It is not, however, the details of organisation that are the same, but the principles; and unless a manufacturer understands thoroughly the principles underlying the use of a method in another business, he is wasting time to try and adapt it to his own use.

The result of the application of the principles of organised management to any business is first and foremost an immediate increase in its efficiency. It begins to get better results from the employees, the material, and the capital invested for a less expenditure of labour, money, and time. It releases the executives from the heavy burdens inseparable from detailed attention to every section of the business, and enables them to devote more time to its

development. It stimulates production, reduces waste, stops leaks, creates new business, saves time, and directs the brain-power and ability of every individual in the business, from the executive to the clerk, into more effective channels. It brings harmony out of discord, and creates a live, efficient, and sensitive commercial instrument out of the weak, inefficient, and blindly operated business of the past.



CONFERENCE ROOM FOR EXECUTIVE AND DEPARTMENTAL HEADS

Modern type of conference room, where all controlling officials of a business can meet to discuss its problems

Sannerd

CHAPTER II

PRIMARY ORGANISATION AND CONSTRUCTION

(1) ORGANISATION AND SITE SELECTION

The Vital Elements of Departmental Organisation : Distribu-
tion of Responsibility : Departmentalisation : Choosing a
Site : The Main Requirements of a Factory Site : Taxation

THE organisation of a manufacturing plant is not merely an arrangement of books and clerical records. It is the application of concrete principles that influence every detail connected with the undertaking, from the foundations of the building up. Clerically, however, an efficient factory organisation enables the head of a business to know what he has done, what he is doing, and what he can do. It brings him into close contact with every detail that affects his business, whether it be in connection with his buildings, machinery, employees, or methods. Later, when he builds a new factory, or buys a new machine, or increases his staff, this knowledge influences him to make the best possible use of his experience. He builds a better factory, selects a more profitable machine, and secures more efficient employees in consequence of what he has learned. The benefits of efficiency in the smallest organisation are therefore cumulative, and the efficiency of a workshop in a single room reflects its influence throughout a business during the entire stages of its growth.

Half the battle in business development is to begin right. More businesses collapse just at the period when they are emerging from the stage where one-man control is possible, than at any other time. Generally, a dominant personality controls the business in its early stages, keeping personal hold on every detail, proud of his ability to keep important details 'in his head' and to be the working head of half a dozen departments all in himself; and under the force of his personality he sees his business develop gradually

*The
danger
of one
man
respon-
sibility*

into a bigger and bigger one, until the goal of a permanent success comes in sight.

Meantime, increased business has added increased responsibility; ten hours a day have grown to fourteen and sixteen; his physique fails to stand the strain; and in the end he is forced to transfer some of his assumed labours to others. And the others? Generally men who have never done anything but what they were told; men with all the initiative bullied out of them; who have never been expected or permitted to carry the slightest amount of responsibility. Even if one of these cogs in the one-man-power machine has still left to himself some spark of initiative, it is rarely allowed scope for action. For the first thing the head of a one-man undertaking relieves himself of is detail—the last, responsibility. And often, before he finds himself compelled to transfer some of this, the mischief has been done, and the business is in a hopeless tangle, which has eventually to be unravelled in the bankruptcy courts. The investigators lay the blame at the doors of ‘bad management,’ which is but another phrase for inefficient organisation.

This is the story of hundreds of bankruptcy cases—and the cause of millions of lost profits. The working head of a business should always be its controlling force and its developing force. In the smallest of businesses these two sections of responsibility should absorb all his working hours. The man who tries to add to these the labour of being part of the working force in addition is expending energy and time on other people’s work that he ought to be devoting to his own. Many a man works overtime to save the cost of a pound-a-week clerk, and misses opportunities for development that would bring in profits amounting to many times that sum.

*The basis
of executive
efficiency*

The first and foremost principle a business man should follow is to divest himself of as much labour and responsibility for details as he possibly can. He should, in fact, so lay out his business that whether it is run by three clerks, or has three hundred employees, the basic principles of its organisation will remain the same. Men are trained nowadays with special qualifications for special work. Given the opportunity they will amplify these qualifications by the use of brain-power and initiative, and make them more valuable.

The man who fails to realise this and insists on doing all his own thinking is wasting the most valuable element

in business development—brains. To get the best out of any particular department of a business, somebody must specialise on its particular requirements, must study its needs, anticipate its wants, and smooth the path of its development. No one man can be the specialist of all the departments of his business. He can control and direct the working of each section so as to secure a harmonious whole and specialise in final results, but if he is to get the best out of his executive work he cannot manage departments at the same time. As captain of a commercial vessel, in fact, ~~he~~ cannot be chief engineer, chef, and boatswain as well. And, like the captain of a seagoing vessel, he must departmentalise, controlling the bridge, while the chief engineer controls the engines, the chef the kitchen, and the boatswain the crew.

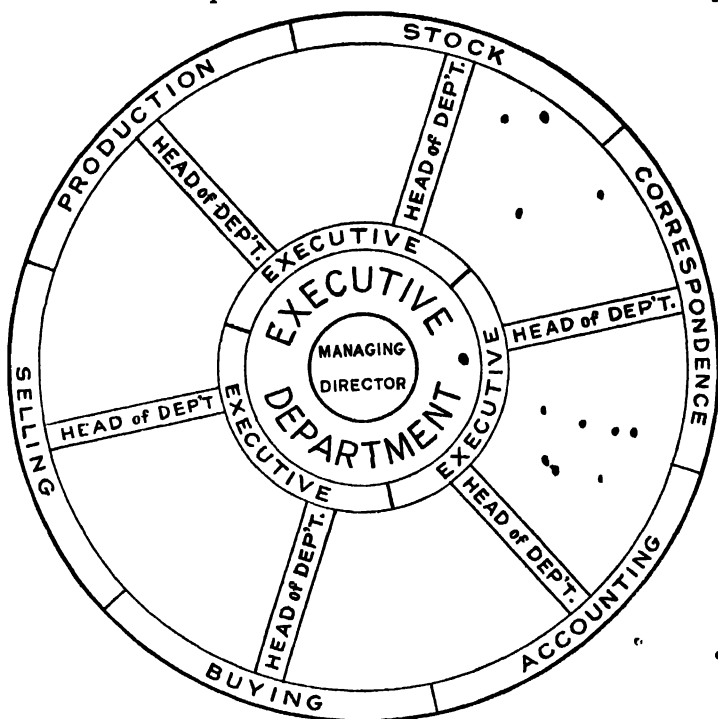
This principle applies to any manufacturing business, from the smallest factory with a clerk and four or five workmen to the biggest of manufacturing plants. Responsibility should be distributed, through the whole organisation. What a man is capable of handling let him handle, and hold him responsible whether he is a manager in charge of a thousand men, or an office-boy in charge of a sweeping-brush. What a factory executive should be concerned about is results, not details. Organised methods are designed to focus these results at the executive's desk, not once a year, but continuously, so that he can keep a watchful eye on the entire work of his business without wasting time by personally investigating details.

The details of each department are the concern of the man in charge. The results of the department are the concern of the executive. *Results, not details* If they are unsatisfactory, the departmental details will provide the cause, which can then be removed. If they are satisfactory, it is obviously waste of time for an executive to spend most of his working hours in watching them.

Nevertheless, careful control of all details is vitally necessary in any business. Details provide the main results of an efficient organisation, by providing information as to past, present, and future work, and not only records of actual working results, but records of the influences at work throughout the business, obtained through the careful analysis of details, must concentrate at the executive's desk.

This is one of the main subsidiary principles of efficient organisation—so to design the methods in use that they

tell not only current facts, but hidden influences also. They must not merely show a certain result, but the influences affecting that result. Results in themselves tell little; analysed and compared they tell much. Analysis naturally implies sectionalisation, which must commence with a close departmentalisation of the business. By



THE WHEEL OF AN EFFICIENT ORGANISATION, COMPLETE IN ITSELF AND THE EMBODIMENT OF STRENGTH COMBINED WITH EFFICIENCY

separating a business into its main constituent parts, it is possible to watch closely the results of each of the sections; and a close separation of the main sections makes it possible to analyse the work of each thoroughly and efficiently, treating each as a separate and distinct unit.

*Dissert-
ing and
classifying*

In big businesses, departments can again be closely dissected into minor sections, and by this means faults, losses, waste, and inefficiency can readily be localised and discovered. Departmentalisation not only simplifies



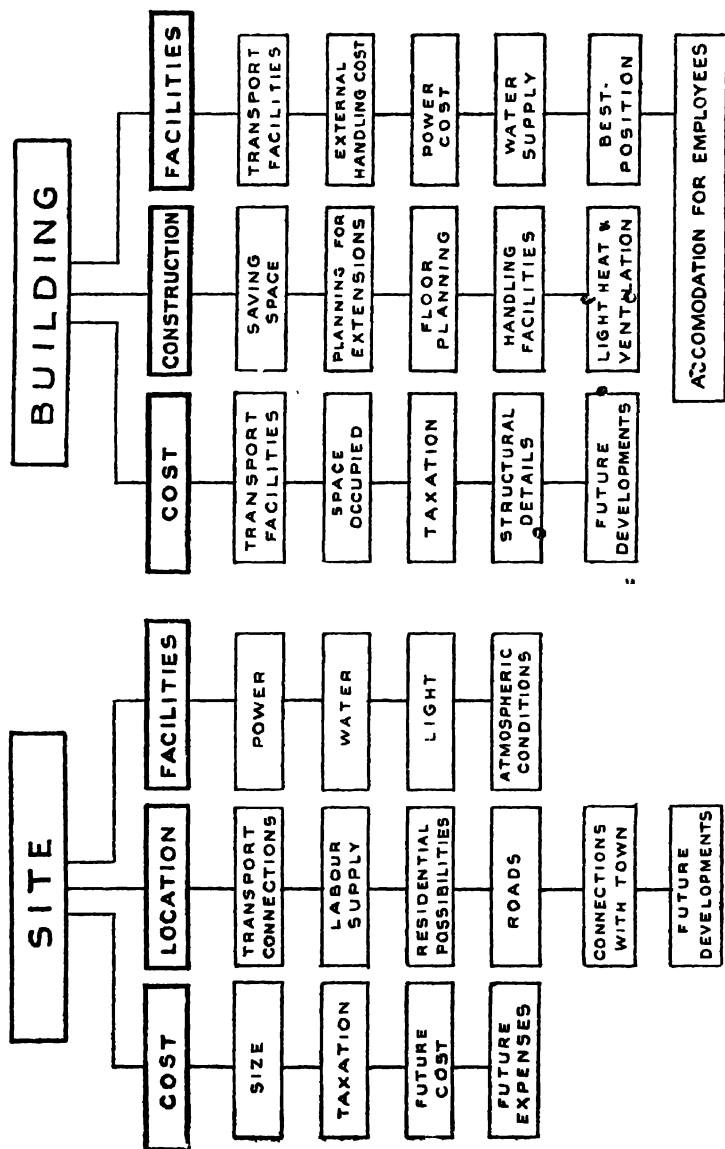
Interior of factory shown on plate facing page 116 and on page 132. Note glass partitions and absence of shading giving greatest possible amount of light. The shading is underground

the work of management, but also follows one of the principles of organisation—the centralisation of vital information through distinct channels. It follows out in business the ledger principle in book-keeping. Many businesses never get past the day-book stage, where the only important fact available is a total. Modern methods carry a business into the ledger stage, where details are sectionalised and classified. Departmentalisation, in fact, means the carrying out of the principles underlying the use of the ledger into the ordinary work of the factory. A sound business is built like a wheel, having centralised control, with a distribution of responsibility through heads of departments (the spokes), and, like a wheel, is the embodiment of strength combined with efficiency.

Factory organisation carries its influence into every detail of the work of the factory. It goes past the factory buildings to the site itself. Choosing a factory is not merely a matter of pounds, shillings, and pence. It is the first important step in the organisation, and lays the foundation for more profits or losses than the inexperienced would imagine. Fortunate indeed is the manufacturer who has the results of a long experience in an efficient organisation to work on when he chooses the site. Such an experience will pay him big dividends in the future.

Almost innumerable influences affect the choice of a site for a manufacturing plant. Main details, such as power, light, and labour-supply are generally thought of as the main points for consideration after that of cost. They are important, but not the most important. The most important point to consider in the selecting of a factory site is the big burden of every manufacturing business—handling cost. This applies not merely to the cost of handling goods in the course of manufacture, but embraces a wide field of expense that only close analysis of the business concerned can determine. Important details that affect handling cost may be noted, however. The handling cost of the contractors in the construction of the factory is one of the first points to consider. This is important, as an out-of-the-way site may entail an enormous amount of cartage that will eventually add infinitely more to the construction cost than the location would save in site cost. This same cause would also influence the handling cost of material inward and outward of the factory itself. An extra mile of cartage cost is small in itself, but to add an extra mile to every load of goods inward and outward over a period

*Choosing
a factory
site*



THE MAIN ELEMENTS THAT ENTER INTO THE PROBLEMS OF SITE SELECTION AND FACTORY CONSTRUCTION, AND MUST ALWAYS RECEIVE CONSIDERATION WHEN A NEW FACTORY IS BEING PLANNED

of years represents a burden on production cost that no factory can afford.

"This question of handling cost must also come into the consideration of site size, as well as in that of future developments. In building a new factory, surrounding land values must be increased owing to the additional population the factory brings to the district. An investment in additional land, therefore, will often pay in view of possible future developments. In a populous district this may not be the case, as the estimated increased value may fail to pay a profitable interest on the additional capital involved. In a heavily populated district, also, where land is costly, a safe minimum of space may be the best to aim for. How this is utilised will depend considerably on individual requirements. Many businesses find it possible to enormously reduce handling costs by means of well-planned factories of a single story, where production can be carried out in a continuous line with a minimum of handling expense. Single-story factories, however, entail bigger site areas, and frequently mean a heavier construction cost, with a consequent bigger capital investment to pay interest on.

Here, then, is a matter for the closest consideration on the purchase of a site, viz. what type of building will show the most profitable results, regarded from every point of view. It is, in fact, not site cost, or construction cost, or in fact immediate cost of any kind that needs primary consideration, but the important factor of *cost to run*. This necessarily includes interest on the original investment, and therefore covers financially both sides of the problem. Cost to run, or to operate a factory, covers a great number of details that must be taken into consideration before a site is selected. Of these, labour, transportation, power, transport, light, water, atmospheric conditions, rates and taxes are the most prominent.

Labour is generally the chief detail to be considered. The labour problem in site selection has many sides. Labour cost varies in different localities, and where low labour cost and other advantages of manufacturing in country districts outweigh the advantages offered by a town site, it must have a great influence in deciding the locality. Where skilled labour is employed, however, it is generally an advantage to locate where the supply is plentiful, rather than be at a disadvantage in this respect. This need not necessarily imply a town site, but a district where trans-

*Buildings
and site
selection*

portation facilities to and from a populous town are efficient, or where local conditions are such as to attract a good class of employee to the district. An important point that is very frequently overlooked is the necessity for making sure that the district has either a sufficiency of vacant property or that it has room for development.

A number of factories in the country are at present faced with a very serious labour problem, owing to the fact that the district has outgrown its living accommodation, and its growth as a manufacturing area is stopped by the surrounding landowners. Many otherwise ideal localities are thus made useless, and careful investigation is often necessary in order to discover local conditions of this kind. Given suitable residential areas, however, and comparative nearness to a town, it is frequently possible to attract the best class of productive labour to an outlying district, and yet have, at the same time, the town surplus always available through railway or tramway connections.

The transportation problem

Transportation is also an important problem for consideration in site selection, and in this connection it is well to remember that a railway siding in an outlying district compares favourably in point of cost with cost of cartage from a town factory to the local goods yard, in addition to saving extra handling in the case of truckloads. Occasionally it is possible to secure a factory site with both rail and canal facilities, and the latter is always a big financial consideration worth studying, especially when the district is within convenient reach of, and in direct communication with, a port. Coal delivered to the power-house direct by canal affects power cost enormously; the reduced cost of handling building materials affects construction cost; and handling cost of heavy goods in and out is cut by a percentage that will often pay a small dividend.

Local power and lighting facilities will often affect the selection of a factory site, especially in the case of a small business. Both power and lighting cost decrease proportionately as production increases, and many districts can provide power and light for factory use at rates that are in themselves an incentive to the small manufacturer who appreciates the proportionately heavy cost of producing his own power and light, or who uses power intermittently and must face a serious waste if he maintains a power plant that is constantly running.

When big power plants are operated, and in businesses



Exterior view of the factory shown in the plan on page 152. The frontage to the road of the space reserved for extension can be seen on the extreme right of the picture.

where a considerable amount of water is used, local water cost and facilities have to be taken into serious consideration. A great number of firms are making use of artesian wells in order to keep water cost at a minimum, and also, in some cases, in order to ensure a continuous supply of pure water of a certain character. Where a great quantity of water is used, therefore, consideration should be given both to cost and to facilities for obtaining water from beneath the site. Atmospheric conditions have also to be taken into account very frequently in considering a factory site.

*Water
cost and
atmo-
spheric
condi-
tions*

Certain industries require special atmospheric conditions for their product, and in most cases have to add to production cost by creating these conditions artificially. Obviously, therefore, the district which provides these conditions naturally for the greatest period of the year means, if only to a minor extent, a reduced production cost, which in many cases is worth careful consideration. For this reason cotton manufacturing has centred round the humid districts of Lancashire, where the atmosphere is more favourable for cotton manufacturing than in any other locality; and other industries have been built up in localities which provided atmospheric or natural advantages which outweighed any disadvantages the district might present in other ways.

An important feature in factory construction, which has never yet received the attention it deserves in this country, is that of local taxation, together with the difficult question of local by-laws and regulations. Other countries have long since realised that the addition of a factory employing a great number of hands adds considerably to the value of the town and district, and, in consequence, do as much as possible to attract the best class of manufacturing plants to the locality. In Great Britain, local taxation is generally high, and there are frequently troublesome regulations to face that affect the value of a factory site considerably.

*Local
taxation*

Coupled with this, again, is the question of transport, as it not infrequently happens that, other things being favourable, bad roads, with or without restrictive regulations, provide a likely cause of increased transportation cost that has to be carefully considered. Town authorities, again, rarely treat manufacturing concerns with any more consideration than they would pay to the purchaser of an outlying plot of grazing ground. Both are possible

ratepayers, but past the assessment of the property the authorities rarely go.

To a town it should always be a matter for careful consideration what benefits the addition of a few hundred residents of a good class would bring, and what attractions it can afford to get the increase. These additional residents must have means of livelihood, which are best provided by manufacturing plants. To place restrictions in the way of factory construction by the imposition of high taxation, and failure to provide good transportation facilities except at other people's expense, is the wrong way to go about getting the increase. Some of the biggest towns in the United States at the present time owe their rapid development to attractions offered to manufacturers during the early stages of their growth. Relief from heavy taxation, provision of good roads, assistance in securing rail and water connections, guaranteed accommodation for employees, and municipal influences directed at the securing of efficient transportation, telephone, and other facilities, have attracted manufacturers from populous districts. These towns have realised that it takes more than the selling powers of the local estate agent to develop a town. They have laid themselves out to find what a manufacturer needs, and to offer him the facilities and advantages that are most attractive to him in order to get the people he brings with him. No manufacturer there need wait long for a good site for a factory, as publicity associations, development committees, and business-men mayors in every part of the country are always busy seeking manufacturers for their vacant sites.

*Modern
methods
of town
develop-
ment*

In Great Britain the opposite is the case, and not merely the searching, but also the investigation of local facilities and expenses is left to the manufacturer. These facilities and expenses, again, are generally of doubtful character. No definite guarantee can be obtained that the facilities will be improved, or that the expenses will not increase to prohibitive figures in the future. The prospective purchaser of a factory site, therefore, needs to give these important questions the most careful consideration. Certain localities, where business men control the working of the local authority, are beginning to take a wider outlook on development problems, and are offering facilities or assisting developments in a small way. Such districts are likely to prove better locations than others where no attention is paid to these matters.

CHAPTER III

PRIMARY ORGANISATION AND CONSTRUCTION

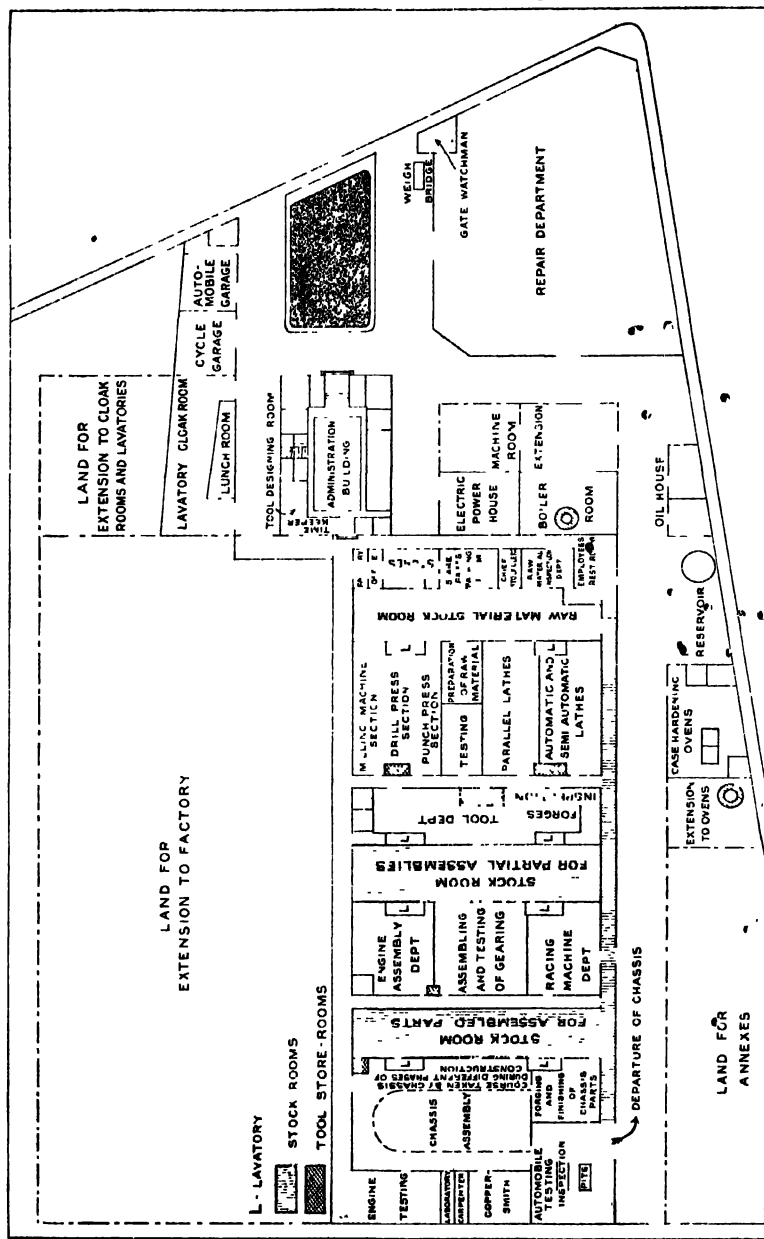
(2) FACTORY CONSTRUCTION AND FLOOR- PLANNING

Designing the Floor Plan ; Future Developments ; Power,
Light, Heat, and Ventilation ; Modern Factory Types ;
Internal Handling Facilities

ONCE a site has been secured, the next serious problem to face is the designing of the floor plan. This is necessary before ever a stone is laid, or a plan drawn up. Floor-planning is the great saver of subsequent handling cost, and the great reducer of cost to operate in the future. Without the advantage of the records of the work of another factory, floor-planning has to be carried on in the dark to a great extent, yet there are many main points for consideration that can always be followed, even when the minor points are not available for consideration.

Chief among these is the question of subsequent developments. Presumably the factory is going to develop its business. If so, there will come a time when additional working space will be required. Properly designed, a factory should have space to develop its productive departments as required, at a minimum of cost. Many factories are built in such a way that they have eventually to be overcrowded to the final limit, when the only way to relieve the congestion is to erect a new building at high cost, and then proceed to disarrange every section of the organisation in order to distribute it over the new space available, much of which will probably be found useless for some time to come. This entails a heavy capital outlay for a building of which only a part can be used ; it results in disorganisation for a considerable period, and a consequent increase in working costs ; and it frequently means the removal of the greater part of the machinery to other departments, with the result that time is lost and a big bill for removal is added to the working expenses.

The results of faulty floor-planning



AN EXCELLENT EXAMPLE OF FORESIGHT IN FACTORY CONSTRUCTION. THIS FACTORY CAN EXPAND TO DOUBLE ITS SIZE WITHOUT INTERFERING WITH PRODUCTION, OR THE COURSE OF PRODUCTION, IN ANY WAY

A factory which illustrates many of the points to be considered in floor-planning is shown on the opposite page. Here, *A modern method of floor-planning* design has followed the principle of saving future expense. Except for the office section, it is a single-story building, well lighted from the top, and the internal arrangements are so planned that handling is reduced to a minimum. These departments, in addition, are laid out to connect with the stores on the one side, on which side also outside departments are arranged conveniently for the departments most concerned, and on the other side each department runs to a blank wall, behind which the firm have reserved land for developments. The result is that if any department gets too overcrowded, and has no space for increase inside the present building, either an extra length for the whole factory, or a section for one or more of the departments, can be erected outside the factory wall without disturbing production in the least, and, outside working hours, can be added to the main building by removing the dividing-wall after construction is completed.

In this way only building expense to meet actual requirements need ever be faced, and this without the slightest disorganisation of the working organisation. The space available allows ample room for the factory to develop to over double its original size without the disorganisation of any department; and only after it has reached the limit of development on that side need the firm rearrange its stores and outside departments.

The front section is retained for permanent buildings, such as offices and employees' accommodation, which are not so much concerned in the increase of output and provision of accommodation for the productive departments.

Compared with this, the experience of another factory might be noted as an example of the troubles of development when no development had been allowed for in the original scheme. Finding the departments overcrowded, and having no additional space available, the owners had to purchase at great expense an adjoining plot of ground. The factory itself was of a type that could not be enlarged without tearing part of it to pieces, and it was decided to divide the business into two sections, transferring one to a new building, and redistributing the other through the old building. In the middle of the construction work, the firm found itself in temporary difficulties, and construction had to be stopped for fully a year, as they could

not afford the necessary capital for the new building, which they had planned to meet all possible developments for a dozen years ahead, after which they hoped to be able to erect an entirely new factory in another district, which would be more in accordance with the requirements they had discovered through costly experience.

In factory construction, it always pays to plan for the future, and in the planning to always keep in view the important questions of expense, capital outlay, and possible disorganisation. Where there is a prospect of a future removal to another factory in the case of an existing business, a careful and continuous study of the requirements of the business should always be made; and many of the methods described in later chapters are invaluable for this purpose, particularly those that are specially designed for the purpose of ensuring the best possible use being made of existing accommodation. The one great point to keep in mind in this connection is to provide efficient accommodation for the productive departments, and always to have space for the development of these departments that can be brought into service with the least possible amount of disorganisation.

*Keeping
handling
cost at a
minimum*

Floor-planning must always be based on the course of production, and, given efficiency in other respects, the best design is that which ensures a minimum of handling of product. It is not always desirable so to design production that it follows a continuous line. There are many businesses where heavy goods are handled in small quantities that in practice find it advisable to plan to reduce the *total* cost of handling rather than the cost of handling the standard product, and in such cases great care has to be used if the desired result is to be obtained. Generally, however, it is found that production can be planned to follow a direct course that will minimise handling, and once this has been done, space for each department can be reserved and floor areas arranged for.

An important question that often interferes with planning at this point is that of power. Where the power used is great, a considerable amount of waste must occur if heavy machinery is located at a distance from the main drive. This question need not arise, of course, where electrical power is used; but where power is to be distributed by means of shafting, floor-planning must always take into consideration the question of waste through long-distance driving of heavy machinery. Occasionally it happens that

the power plant will be located near the middle of a factory for this reason; and such a plan need not in any way interfere with the arrangement of a continuous line of production if the buildings are properly designed. The shortening of the power drive, as well as the avoidance of angles and multitudinous countershafts, mean much in subsequent saving when given proper attention at the time the floor plans are designed; and when the distance is great or when the arrangement of departments militates against efficiency in this respect, a considerable saving can often be effected by the use of motors, either departmentally or for each of the heavier machines.

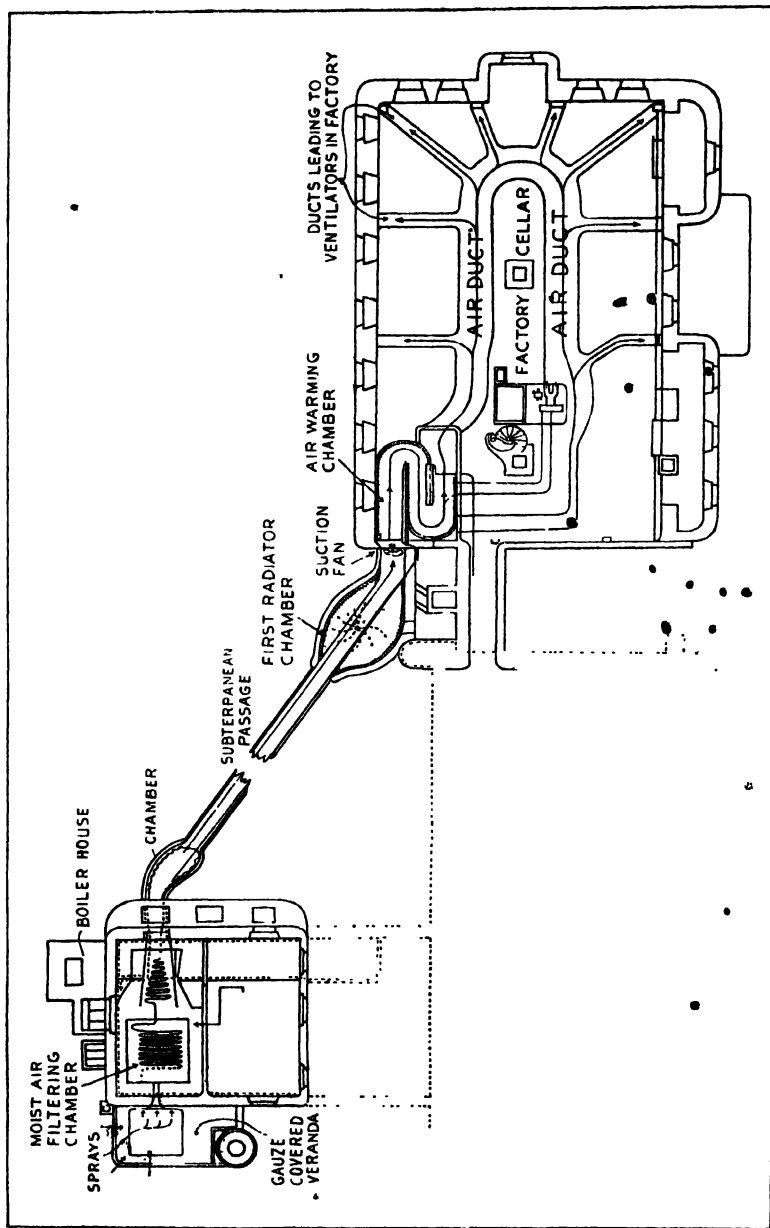
Providing power is available at a cheap rate, an electrically operated plant has many advantages not shared by the shaft-driven one. Cleanliness is one great advantage where electric power is used, and where electric power has been part of the original design, as in the case of the factory shown at page 145, where the driving motors and shafts are underground, more light and a greater measure of safety can be secured. In addition to this, electricity has a very great advantage where the power required is intermittent, owing to the saving effected when the machines are not in use. Where steam is used, the engine has to be kept running during the whole day in order to provide intermittent power for the various departments. When departmental or individual motors are used, they only use power when the machines are in action, and for this reason frequently pay to use, even when electrical power is high in cost, owing to the great saving in total power cost they effect.

The power problem

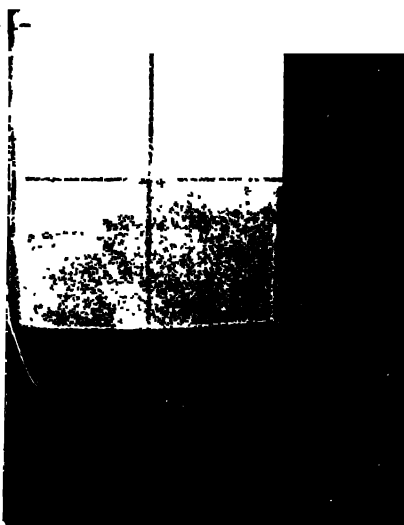
* Lighting, heating, and ventilation are important points that need consideration when planning a factory, apart from any ideas the architect may have on the subject. Each and all of these affect the production at some point or other, and must follow for consideration after floor space and power have received attention. Requirements will vary in different businesses, but in all businesses the question of future operating cost must take precedence with first cost.

An example of careful planning before construction is shown by the plan on page 156, which illustrates an excellent ventilating, air-purifying, heating, and humidifying system which was actually built into the factory of a Swiss underwear firm. All the necessary atmospheric conditions demanded by the material handled, and required for the

A pre-arranged ventilating system



A COMBINED AIR-WASHING, HEATING, VENTILATING, AND HUMIDIFYING SYSTEM THAT WAS DESIGNED FOR A SWISS UNDERWEAR FACTORY BEFORE A BREK WAS LAID. AN EXAMPLE OF FORESIGHT IN FACTORY PLANNING



THE COMBINED VENTILATING SYSTEM SHOWN ON THE OPPOSITE PAGE

Standard

The first picture shows exterior of air washing chamber, the windows being of gauze. The second shows interior of same air water sprays which wash the air as it is sucked in by the fan. The bottom picture shows ventilators through which purified air finds its way into factory electric fans taking out bad air from other parts of room

benefit of the employees, have in this case been embodied in a single system, which was planned before construction commenced.

All these three vital points not merely affect the efficiency of the factory, but are, in addition, vital to the employees, and must be regarded from all points of view if they are to produce the greatest possible efficiency.

Factory architects in other countries have gradually developed several distinct types of structures, designed to give the greatest possible efficiency in this respect. Many of these, when more than one story, have enormous window space compared with the usual type of factory building. This principle not only permits more light to enter, and reduces lighting bills in the winter months, but also permits of much wider buildings being built owing to the more efficient lighting secured in the middle of the floors both through the greater window space and also by means of solid white ceilings which serve as reflectors.

*Types of
factory
buildings*

They thus remove one of the main causes of waste ground, by permitting wide buildings to be erected where, under ordinary conditions, a considerable ground space would have to be wasted in order to provide light areas, either in the form of a single quadrangle or by building wings to a narrow main building. Floors built on this principle, however, are higher than usual, in order to allow a greater area for reflected light. As a consequence they are better ventilated, and where restrictive factory regulations have to be met, permit of the fullest possible use being made of floor space without passing the legal limits of cubic air space allowance frequently fixed for each employee.

Another type of building in common use is the single-story structure with the saw-tooth roof. This, although of comparatively early design, has been considerably improved during recent years by experienced factory architects, and since the adoption of steel and concrete for factory buildings, many changes in the general design have been made which add considerably to the efficiency of this type of building.

Factory construction, from an architectural point of view, has, in fact, made enormous strides during the present century, and has evolved a literature of its own, in addition to receiving more of the attention it deserves from the professional and technical journals. It is a subject that covers a wide radius, and that cannot be dealt with within the compass of a single chapter. An enormous amount

of information on the subject, however, is always available to the manufacturer who intends building a factory, and this information covers innumerable points of interest which are of the utmost importance if the association of architect and owner is to produce the best results.

Whether a factory design permits of efficient routing of product or otherwise, it should take into consideration the value of mechanical methods of handling. These are being rapidly developed, both in the shape of power devices and others which are operated by gravity, and are already of almost infinite variety. Mechanical transporters both for outdoor and indoor use help to cut considerably the cost of handling, especially when the distance to be covered is great, while in big plants the use of overhead cranes and internal truck systems is already becoming general. These again are often supplemented by fixed cranes in suitable positions which relieve the overhead cranes of much of the miscellaneous work, in addition to saving labour at machines where heavy materials have to be handled. The advantages of mechanical methods where heavy materials are concerned, however, are fairly well understood by most manufacturers.

It is in the handling of lighter products that more attention needs to be paid to their value. They are especially valuable in factories where light articles are handled in a direct line, and in buildings where production follows a definite route, whether on a single level or down through several storeys. In one case a mechanical conveyer is used in a biscuit factory, and picks up the unlabelled boxes at one end of the room, transports them along the labelling table and through a drying-room, finally depositing them on the packing tables. Behind these, again, a gravity conveyer takes them and deposits them direct on to the shipping tables ready for picking up by the crane and lifting on to the trucks. In this case goods going out immediately are handled entirely by mechanical methods and a great amount of non-productive labour is saved.

In a big soap factory, where the cart road separates the main buildings from the canal, a movable gravity conveyer picks up the heavy cases at the packing-room floor, and deposits them into the barges a considerable distance away, saving an amount in handling cost which more than halves the cost of the former methods. (See Plate facing page 168.)

Innumerable instances of this kind could be quoted to show the application of labour-saving principles both in

the original factory design and also for overcoming disadvantages inseparable from old buildings. It not infrequently happens, of course, that the line of production can be designed downwards in a factory of several storeys by the use of gravity methods of handling, with an efficiency quite as high as could be secured in the more expensive single-story building.

Great care is therefore necessary in analysing the problems of handling cost in connection with factory construction or purchase.

CHAPTER IV

THE EXECUTIVE DEPARTMENTS

(1) EXECUTIVE ORGANISATION

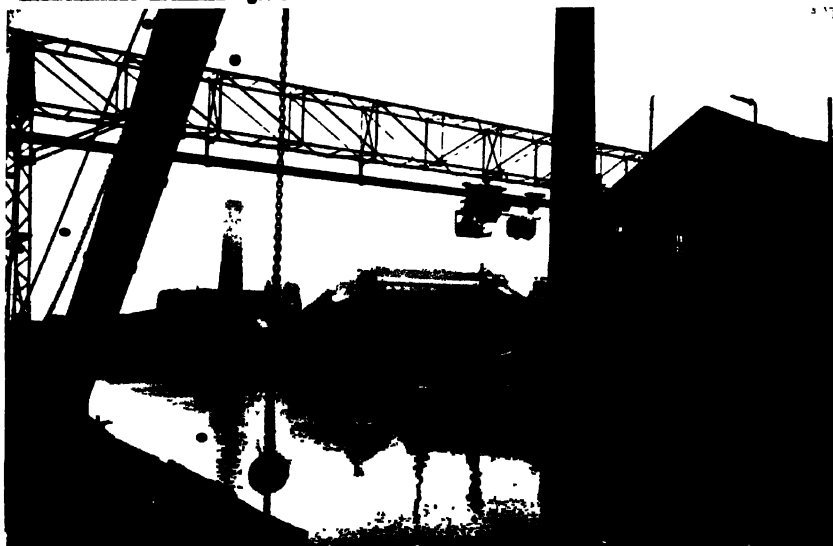
Their Position and Responsibilities : Designing an Executive
 Organisation : Choosing Executive Heads : The Division of
 Responsibility

THE position of the executive department in a business depends considerably upon its size. In the small business, where control centres on a single individual, assisted by a few foremen or heads of departments, executive control is found in its simplest form. In the big plant, however, it may be distributed through the organisation in a manner difficult for the outsider to understand. Frequently, in these big organisations, a member of the executive staff will be found in charge of a section of the work with few or no assistants, and may have infinitely less power than a department head who controls hundreds of men, yet has no executive authority. The reason for this is that the executive or the executive staff is in charge of merely the chief avenues of control over the vital sections of the business, and is responsible for the operation of the various sections, which may cover one or a dozen departments.

Distribution of executive control

The distribution of executive control, therefore, depends upon the size and character of the business, and no hard and fast rules can be laid down for the arrangement of it. Generally speaking, each main section of a business should be in charge of some member of the executive staff, which may be composed of the directorate, or of the chief officials of the company. The small business would probably have a single executive until it reached a point where not merely responsibility, but control, had to be divided, when one or more executive officials would be appointed to take charge of the individual sections.

A plan that is finding favour with many of the biggest organisations is the appointment of the most efficient department heads as directors, with control over sections of the business instead of single departments. Centralised

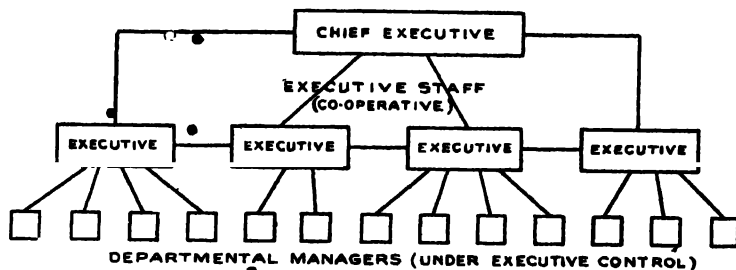


A 'TELFORD' SYSTEM IN USE AT THE 'CLARNICO' FACTORY

This carries goods between factories situated on different sides of a canal. The trucks are standardised for internal use, and can be transferred to any part of the factories without unloading.

control is then maintained through directors' conferences and the authority of the managing director. The same plan can easily be followed in the smaller organisation by conferences of departmental heads under the control of the chief executive, and by this means the directing power of a business is made more efficient through the elimination of friction between the sections.

Relatively, each member of the executive staff is the chief executive of a minor business, for which he is solely



SHOWING THE DISTINCTION BETWEEN EXECUTIVE CONTROL AND DEPARTMENTAL RESPONSIBILITY. EXECUTIVE CONTROL IS CO-OPERATIVE, AND LINKS UP THE MAIN SECTIONS OF THE BUSINESS INTO A SINGLE CONTROLLING AUTHORITY

and entirely responsible. He differs from the departmental head in that, although the latter is responsible for the internal efficiency of his department, he receives his instructions from a superior; while the executive controls his section in his own right, though co-operating with his co-executives in maintaining the efficiency of the entire business, and preventing friction between their respective sections. Department heads represent the principle of distributed responsibility, while executives represent the principle of distributed authority and control.

Naturally, even the best of executive staffs would be theoretically imperfect without a head, and this position is the work of the managing director. Nominally, the managing director is the supreme authority, and controls the executive staff in the same way that an executive head controls the heads of the departments he is responsible for. In practice, however, it is found that there are fixed limits past which the individual authority of the managing director loses its efficiency as a directing force. Changes and developments in any section of a business must influence or react on other sections, and no one man can possibly

The executive head

follow the course of every change and every development to its final results. For this reason the chief executive of a business should use his power as an individual sparingly, and when dealing with general problems affecting the entire organisation should make use of the knowledge of the members of the executive staff, who are each affected in different ways by any changes made.

This principle results in the close co-operation of the managing director with the members of the executive staff in the joint management of the business, and applies with equal force to the management of a collection of departmental heads by each individual executive. In many of the biggest organisations in the country the value of executive co-operation has been realised to its fullest extent, and daily conferences take place not merely of executives but of department heads, managers, and even foremen, so as to maintain an organisation as frictionless as possible.

*Value of
distributed
responsibility*

Responsibility is the great developing force behind all that is best in a man's business ability. In the selection of men for executive positions, therefore, care should be taken to select those who have proved themselves capable of carrying responsibility without abusing the trust it carries with it. The business man who is himself too great a glutton for control creates the worst possible kind of executive head. Regarding himself as indispensable, he influences others to take the same point of view of their position. There is no worse kind of executive head than the 'indispensable' man. He fails to carry out one of the first principles that should underlie the development of an efficient organisation—the judicious distribution of responsibility through the entire working force. Once a man gets the feeling that he is indispensable, or that it is to his interest to create that impression, he must inevitably begin to stifle the ambitions of those under him, retaining as much control and responsibility as he can possibly secure, and preventing others from developing into efficient employees by his jealous methods. Such a man is useless to any business as an executive, whether he be the head of the entire organisation or merely one of its employees.

The ideal executive is the man who appreciates the value of the men under him, and who aims to develop them for the benefit of the organisation as a whole. Once get the selfish spirit into an executive organisation and its

entire efficiency is impaired. One prominent manufacturer adopted a method of dealing with the 'indispensable' man that deserves wider notice. Having interests abroad, he left his business in charge of his chief executives. These men developed the 'indispensable' trait during his absence, and on his return he found the business being operated entirely on the opinions of three individuals, who were retaining a monopolistic control over every detail. He thought much, and investigated more, but said nothing. Soon after his return the business was registered as a company, and the three individuals began to pride themselves on being certain directors in the near future. These individuals he took one at a time into his private office, taking care that until the interviews were over they did not come in contact with each other. The first question he asked was whether they knew of any employee capable of taking over their duties. The answer in each case was in the negative. Following this came a surprise, for to each one he said :

'I have been considering the appointment of three of my employees as directors to act as executive heads. Since there is no one capable of undertaking the responsibility for the details of your department, it would obviously be unwise to remove you from your present position, and I shall therefore look elsewhere for a suitable person. Probably, at some future date, you may have found it possible to develop some capable assistants who can undertake your duties, in which case I shall be pleased to give the matter further consideration. In the meantime, you will remain in your present position, subject to the authority of the director who is appointed to control your section of the business.'

No more thorough lesson in the duties and responsibilities of an executive position could have been given to men than this. Of the three, one resigned. The remaining two were allowed to remain sub-heads for some time, but later were promoted to executive positions without a position on the directorate. In this way they were taught the vital necessity of utilising every ounce of brain-power in the business, and the greater control and efficiency gained by the proper distribution of responsibility. Each in turn qualified for the directorate, but their folly kept them out of the coveted positions on the board for a considerable time.

A man must have many qualifications before he is capable

FACTORY ORGANISATION

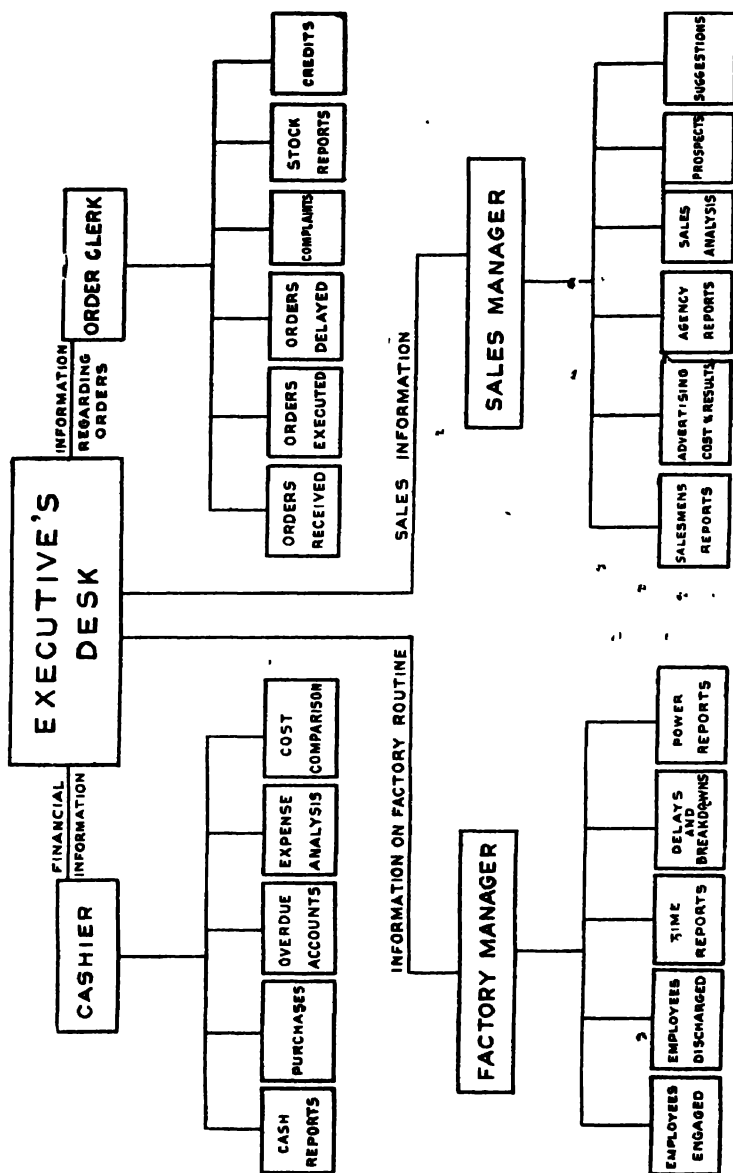


DIAGRAM SHOWING HOW VITAL INFORMATION FROM EVERY SECTION OF THE BUSINESS CONCENTRATES AT THE DESK OF THE CHIEF EXECUTIVE, *via* THE DEPARTMENTAL HEADS

of handling an executive position. First and foremost, he should have a thorough knowledge of the business. A man who has grown up in an efficient organisation and who knows all its intricacies is of far greater value to a business than the man who is imported from outside. The outsider is valuable only when a business has failed to carry out the principles of efficient organisation, and needs thorough reorganisation. In such a case an outsider who has the requisite qualifications, and who has had a wide experience in organisation, will often provide the basis for development on lines of greater efficiency, and will thus be of incalculable value to a weak organisation.

Self-reliance, judgment, initiative, and ability to carry responsibility are the main qualifications of a good executive. Each and all of these can be developed in employees, and in a well-organised business, where the right kind of executives are in control, these qualities are naturally developed in every employee from the office boy up. In fact the best businesses are those which develop their own executives, and never need to bring in outside assistance in building up their organisation. Few, however, have succeeded in doing this under the older methods of management, and until the principles of efficient organisation become more widely adopted, businesses will need to import the experienced executive in order to assist their development. The choice of a suitable man will then depend upon the knowledge of the chief executive, and the wider his knowledge of the basic principles of organisation is, the more likely is he to select the right man for the position.

A close division of responsibility should always be made in the executive department of a business. This entails a close departmentalisation of the business as a whole. In many businesses it is no uncommon thing to find two or three executives interfering with the work of a single department or individual. This is bad organisation. Responsibility should follow clearly defined lines, and should not overlap. At first sight this may seem an almost impossible condition to many businesses, where more than one executive department is concerned in the work of some section of the business. If properly analysed, however, the problem will be found easy of solution. The first point to consider is the fixing of responsibility, and the arranging of direct lines of control. These may overlap in theory, but need not do so in practice.

It will, in fact, generally be found that although more than one section is concerned in the work of a department, each is concerned with merely some portion of the work that links up with the work of its own section. The department itself will range itself naturally as a part of some distinct section which will control its working, leaving the other sections to influence the portions of the work in which they are concerned, either through the department head or direct by means of reports. It should always be the aim of the designer of an executive organisation to prevent the overlapping of responsibility at every point, and the first important aid to this end is the careful departmentalisation of the business.

CHAPTER V

THE EXECUTIVE DEPARTMENTS

(2) DEPARTMENTAL ORGANISATION

• •
Choosing Departmental Heads : Executive 'Hindsight' :
The Concentration of Details at the Executive Depart-
• ments : Chart Systems : Executive Meetings

THE selection of department heads is quite as important as the selection of executives, and the same qualifications are necessary in a minor form for these as for the higher positions. In fact in a properly organised business each set of department heads should be a minor form of executive organisation, and should be the source from which the executive staff is recruited. Consequently, it is of the greatest importance to see that they have qualifications that not only fit them for their position, but that will in the future help to qualify them for higher positions in the business. They should be impressed with the necessity for qualifying themselves for the position above them; as well as with the equally important necessity for training their subordinates so that they will be able to take added responsibility in their turn. *Selecting departmental heads*

It should rarely be necessary in any business to import a department head from outside the organisation. In special cases, where a man is needed for new technical developments with which the ordinary employees are unfamiliar, such a course may be justifiable. For the ordinary work of any business, however, it should be able to find its subordinate officials among its own employees. New blood may be a vital necessity in the executive department, but new blood in the subordinate departments is likely to prove either no more efficient than the old blood, or will, on the other hand, create such radical differences in methods that it will disorganise instead of reorganising.

A safe principle to follow in handling a working organisation is to have all changes made from the top—that is, to change the controlling force if necessary, but to disturb

the remainder of the organisation as little as possible by the importation of entirely new blood. A complete organisation is a delicately balanced machine, and every part must work in harmony if it is to be efficient. To import new methods and new ideas into a single section, irrespective of the requirements of the organisation as a whole, is to upset its equilibrium. For that reason, an old organisation that has had little internal change will often be found to be a better working machine, though probably sluggish in its action, than a newer organisation that is merely efficient in places. Only when the most perfect methods of control are in force, and where a man is bringing in new technical knowledge, or some special ability that can be made subservient to the general organisation through the power of the executive department, should the appointment of a responsible department head imported from outside be regarded as justifiable in an existing organisation.

In such cases, of course, a man may help to impart new life to a decaying department through his superior knowledge and experience, providing he has an efficient executive above him. Inefficiency in the departments, however, generally implies inefficiency in the executive, and when such is the case the remedy is obviously a change in the executive for the benefit of the section as a whole, rather than a change in the head of a single department, as the influence of the executive may nullify any seeming advantage the minor change might bring.

*Creating
channels
of infor-
mation*

An important advantage secured through the proper organisation of the executive department is the complete and efficient knowledge it provides for the consideration of the central authority of the business, through the distinct channels of information it creates. Keeness of competition makes business development and the operation of businesses more and more difficult, and the modern factory proprietor finds little time to devote to the details of production. The constant necessity for business foresight, the development of the business, and the difficult problems of finance need his attention almost constantly; and only by neglecting these important factors in manufacturing success can he find time to be constantly watching the wheels of the production machine behind him. Through the aid of an efficient internal organisation, however, he is able to keep an eye on the details of production without the necessity for devoting much time or attention to its operation.

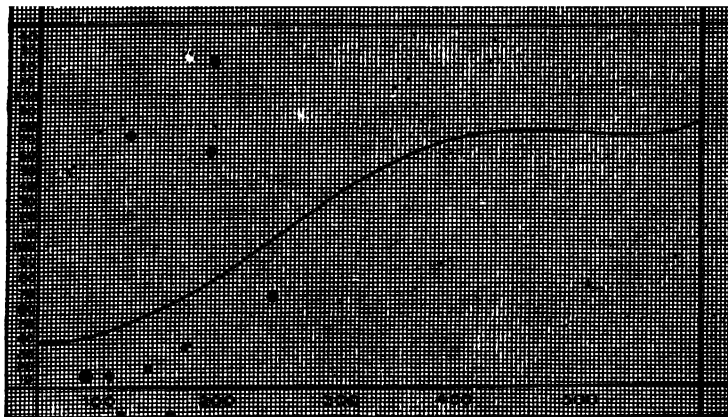


In the above picture soap cargoes are shown which are transferred across a rail and straight on to the barge by gravity



Mechanical conveyor which picks up empty cases, carries them along for the various packing operations, and finally leave them at the scales for weighing and forwarding

Systematic management, by concentrating information regarding important details at the executive's desk in a comprehensive form, forms the basis of a most efficient extra business sense—executive 'hindsight.' Departmentalisation provides efficient links of detailed control, and through these the executive is able to receive daily reports of every section of the business. These reports,



A SIMPLE CURVE USED IN SCIENTIFIC CALCULATIONS—THE BASIS OF ALL THE ORIGINAL TYPES OF MANUFACTURING CHARTS

planned so as to review the entire organisation, keep him in touch with the entire details of its working, and by comparison and analysis he can check results in a manner that no amount of personal investigation would enable him to follow. This relief from the constant strain of personal attention to the working details of the factory enables him to devote more attention to the important questions of finance and development, and through the centralisation of control he is able to direct his entire undertaking harmoniously and to the best advantage.

So many details enter into the operation of a big factory, however, that even with the advantage of concentrated reports and ready analysed financial statements, the chief executive is likely to find the work of investigation somewhat tedious. In the bigger businesses the head may find it necessary to be frequently absent from the factory, and in any case is likely to have little time to

devote to the working details of production. He reaches the point, in fact, where he has rid himself of the control of all details, and can only concern himself with policies and results.

This condition of affairs has led to the introduction of simpler methods of recording the details of production, which save the time of the executive while permitting him to keep in close touch with the work in progress. The earliest attempts in this direction took the form of charts, where zigzagging lines, often crossing each other, represented the upward and downward course of some section of the reports. These simple charts still prove exceedingly efficient for many purposes, and are not likely to lose their popularity for the purpose of simple records.

*Modern
chart
records*

From these original chart methods, however, improved forms of chart records were developed. Instead of simple black lines to represent the course of a set of figures, lines of different colours were used on the same chart, thus enabling several sets of comparative figures to be recorded on a single form, where their relation to each other could be seen at a glance. Further developments took place in chart forms that enabled an entire analysis of a set of figures to be recorded on one chart, showing not merely the relation of each section with the others, but also the comparisons with previous results day by day or week by week. In addition to these, chart forms have been introduced for different purposes that literally cover the entire range of business control and management, and that make it possible for an executive to review his entire organisation day by day by merely glancing at the various chart records on the walls.

The application of various systems of this kind to the requirements of a manufacturing organisation will be dealt with in a later chapter.

The linking up of an organisation as a complete whole must be carried out through the executive departments. Unless these work in mutual co-operation with each other chaos is bound to result, owing to the operation of conflicting methods and opinions throughout the business. Each section as well as each department of the business has its own special problem and requirements, and it not infrequently happens that satisfaction can only be given to one at the expense of the others, or that the introduction of a method of advantage to one section will have an adverse influence on the others. Mutual co-operation

between executives is therefore essential to the well-being of any organisation, and this is best achieved through the medium of frequent conferences, at which the entire work of the organisation is brought under review. These conferences, while termed 'executive' conferences, should in reality be meetings of all officials who exercise any direct control over sections of the work.

The departmental heads of each section may also have their conferences, presided over by their own executive, who will act as the representative of the section at the executive meeting. The main conference, however, should not be limited to the board of directors, or the executive staff, but should cover the entire controlling force of the factory. The cashier, for instance, may be under no minor executive official, but be responsible solely to the managing director. In such case he is literally on the same footing as a member of the executive staff in that he has control of a section. He is, therefore, entitled to be brought into the conferences of the executive staff, since he has no representative there but the chairman, who is in the same sense the representative of the entire meeting.

At such conferences, each official should be prepared to bring forward the requirements of his own section after the general business of the organisation has been dealt with. In the case of important changes which are to be proposed, it is always an advantage to have them listed on an agenda beforehand, so that the other members of the conference may study them and investigate the possible results of their operation in their own department. Changes suggested at meetings of this kind are frequently discussed in a preliminary manner first in order to get the main points of the subject thrashed out, after which a final decision is postponed to a later meeting in order to leave time for further investigation. In this way only such changes as are proved to be for the good of the entire organisation are approved, and friction between the departments is obviated.

From the work of the executive meetings the chief executive learns much about the organisation that would not ordinarily come before his notice. He gains a knowledge of every section of the business, and is able to apply that knowledge to the best advantage in his management.

Where the best men are employed as executives, men who have the interests of their sections at heart, these meetings are far from being frictionless. This is not necessarily

a bad sign. It generally means that the men are fighting for their departments for some very good reason, and when the matter has been finally settled the result is often more satisfactory than it would have been with a less active set of men in power. Executive meetings are the one and only place in a manufacturing organisation where friction should have any place at all. Concentrated there, it can be overcome. Distributed through the organisation it may work incalculable harm. The executive meeting is therefore something more than a harmoniser of methods and the connecting-link of the organisation. It is the safety-valve of the business; and this one fact alone should justify its more general use.

CHAPTER VI

THE LABOUR PROBLEM

(1) MANNING A FACTORY

Manning a Factory : Personality in Handling Men : Selecting the Employee : Weeding out the Inefficients : Labour Unions

LABOUR is the chief material used in a manufacturing business. Frequently it will be found to exceed in total cost the entire material and expenses of the factory. Yet, in spite of this fact, it generally receives far less attention than the minor purchases. Men who will haggle and bargain for days in order to cut a farthing a pound off the price of some raw material, or wait months for a favourable time to purchase, or who maintain an organisation solely for the purpose of testing and ensuring the quality of their purchases of material, will often leave the labour problem to take care of itself, taking men on trust, leaving the engagement of employees to the minor officials, or trusting to the personal contact of foremen and men to weed out the inefficients. *The importance of labour*

Men provide an infinitely greater problem to handle than material. A ton of coal, a roll of copper wire, or any of the material used in manufacturing, can be subjected to chemical analysis or other test, and proved against sample. Men are subject to none of these tests. Every one is different; each has his own individuality; and the only test that can be applied is the individual test to each one. From the results of bad material the manufacturer has generally some means of redress; from the results of inefficient labour he has little, if any, and has to face the loss himself. All this, therefore, points to the necessity for exceptional care in the selection and employment of labour.

After construction and the planning of an efficient controlling force, the selection of suitable employees is the primary consideration. Just as infinite care must be used in the selection of executive and department heads,

so also must infinite care be used in selecting the working force of the factory.

*Manning
a factory*

The labour problem as applied to the manning of a factory has many sides. Technical ability must always count for much in the selection of men, of course, but there are many qualifications not covered by that term that need consideration. Technical ability is only of the greatest value when properly applied, and while a foreman may be able to judge a man's ability to do certain work, it rarely happens that he has also the intuitive knowledge necessary to judge a man from other and equally necessary standards. A man's efficiency as a workman is always influenced to an enormous extent by his personality and his training, yet it is rarely that an employer takes these into account when engaging an employee for factory work.

To many employers a workman has no personality. Given physical strength, the requisite amount of technical knowledge, and ability to follow the instructions given him, he possesses the necessary qualifications to act as an expressionless cog in the wheel of production, which is generally as much as is asked of him. Under such a system a man's ability is starved and nullified. He becomes not merely a mechanic, but mechanical. The best side of his character being prevented from having play, he naturally develops his worst side. He becomes mulish, gives nothing for his wages but what they call for, and not even that if he can avoid it with safety. Such men are not workmen, but labourers—and have to be handled like labourers, in gangs, with only the spur of possible discharge to stimulate their efforts.

A badly organised business develops such men as a natural consequence of its inefficient organisation. When the principles of efficiency rule at the top, however, they should be able to permeate the whole organisation down to the bottom. The care that is used in the selection of executives, therefore, should be used in the selection of workmen; and in both cases something more than mere technical ability should be considered before they are appointed.

*Attracting
the best
class of
men*

An efficient organisation makes use of its entire brain-power, not merely in the upper sections, but throughout the entire business. This necessitates the selection of employees who are something more than capable workmen. It entails careful selection of men, not mechanics;

and the best organised business is the one that can always fill up the gaps in its organisation from among its own staff—where the capable mechanic can rise through a foremanship to the management of a department, and where the secretary's desk is always a possible goal to the efficient office boy. Such a business invites the employees to give of their best, and to aim at the better positions above them.

But the possibilities it offers will only be appreciated by the best class of men, and these should always be selected because of their qualifications, not merely to fit the job they are wanted for, but to fit the organisation and its principles. From such men a firm can always recruit its working force. It therefore wastes no time in training doubtful men, but lets in its necessary supply at the bottom, where a temporary inefficiency will do the least possible harm.

Big organisations, however, must at times import men for the higher places, not necessarily because of failure to develop their own employees, but owing to developments or changes which leave gaps that must be filled from outside. This entails the provision of methods that will ensure the most careful selection being made. Close investigation of an applicant's record is always necessary, but, in addition to this, the personal interview must always be the final source of information. Technical ability may be proved through the record of the applicant, though it is often the best policy to allow his prospective foreman or department head to interview him with a view to a verification of his ability in this respect. By the use of carefully planned lists of questions, much detail of importance can be secured regarding applicants before any interview takes place. When this has been supplemented by the report of the foreman, the prospective employee should be seen by some executive or specially appointed official who has the necessary qualifications and personality for dealing with applicants. *Selecting the employee*

Every business can make use of the services of some kind of an employment department, however small. In the bigger plants this would be a permanent department, concerned solely in the maintenance of an efficient staff, and, in addition to the engaging of employees, would also keep in touch with all the employees in the business, both by means of special records and personal contact, so as to be able to recommend the best men for the higher positions, as well as to review any man's record when he

required an increased salary. In this way it could provide detailed figures and records to set against a man's request or an executive's recommendation, and a man's efficiency could thus be judged from every point.

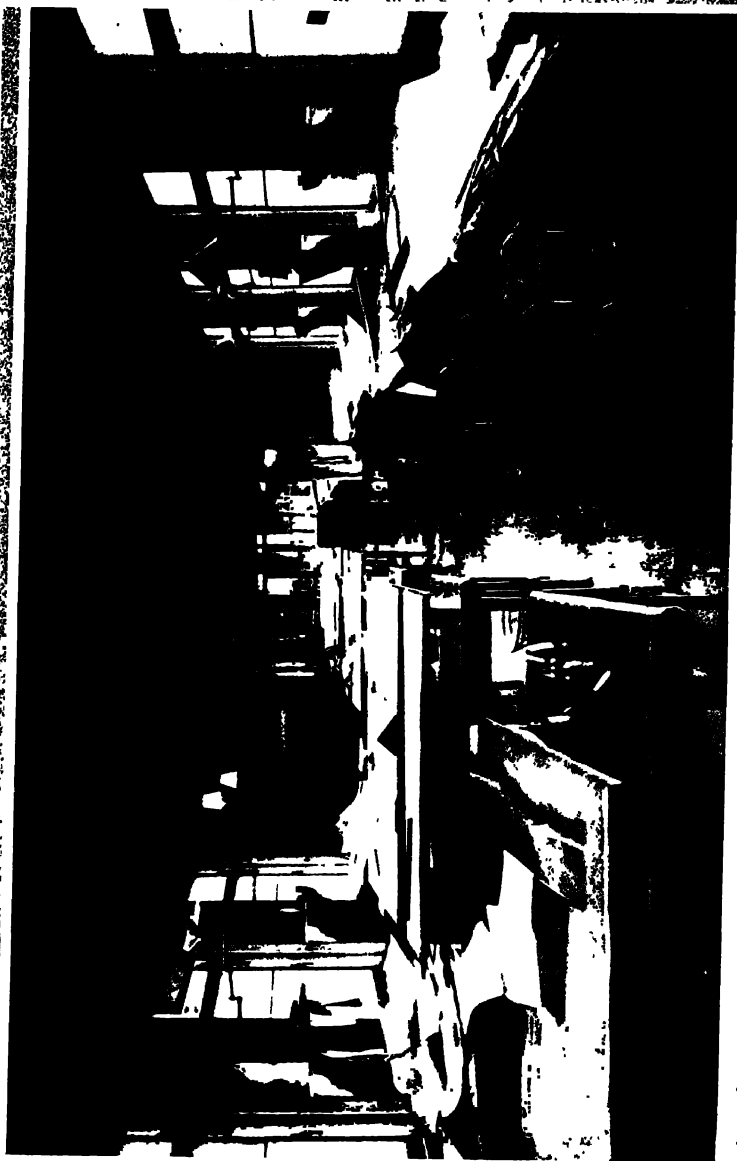
*Weeding
out the in-
efficient*

In smaller businesses a permanent employment department could not be maintained for such a purpose, and it therefore devolves on some individual to take charge of appointments when any are contemplated. One or more useful records can be arranged that will provide all the necessary information to enable this official to carry out his extra duties efficiently. Records of this kind serve two distinct purposes. They help to locate the best men, and they provide the best means of weeding out the inefficient. An inefficient workman is a constant drain on a factory's resources. Failing to give his best, he is filling a job that a better man would make more profitable. The influence of an inefficient workman, again, is not confined to his own bench or machine. It affects those who work with him, and his inefficiency is likely at any time to result in faulty workmanship that will disorganise the work of a department. The difference between inefficiency and efficiency, whether in a single workman or in an entire organisation, is the difference between profit and loss; and for this reason methods that help to weed out inefficiency at any point are profitable in the end.

Time-keeping, inspection, and wage records provide many important facts regarding men that are invaluable in maintaining efficiency in the working force, and these can readily be analysed and posted to separate records for reference as required. Personal contact, however, is the only method of investigating the personality of a man, and of discovering the valuable characteristics that, with careful development, will prove the most valuable to the organisation.

*Selecting
an employ-
ment
manager*

Few men possess these qualifications, and the most careful selection should always be made from among the executive staff in order to select a man who is in every way fitted for the position of interviewer. Generally the men who are the best workmen, and who have had the longest record of efficient workmanship, are but poor salesmen of their ability, and to an impressionable man would make but a poor show. The inefficient, who is constantly changing jobs, gets an experience of personal salesmanship that he often uses to advantage where there is no efficient employment manager to investigate the character of the applicant.



AN 'L'-SHAPED DRAWING OFFICE The chief draughtsman's office is at the corner, thus giving efficient supervision over the entire office

The interviewer of applicants, therefore, needs to be an expert judge of character, and a man capable of learning as much as possible from a brief interview. His report on an applicant should carry more weight than any other, since it is his duty to select men for the benefit of the business as a whole rather than on account of a single qualification. According to conditions and his standing in the business, the employment manager may or may not be the final controlling force over the employment department. Usually, he is merely the interviewer and the reviewer of the reports from other sources, being responsible for all investigations as well as for securing and verifying references. When his information on a man is complete, he can either send it with his own personal opinion to the executive in charge or can prepare a special report of his own, on which the executive will base his decision, this report being kept as the permanent office record, while the miscellaneous detail is retained by the employment department.

Every man who applies for a job in a business is running a business of his own. He has something to sell and is looking for a buyer. The best men are generally as careful in the selection of prospective buyers of their ability as the manufacturer himself is in the selection of customers; and once a firm gets a bad record as an employer, it stands little chance of getting the best and most efficient class of employee. What a workman is looking for is not merely wages, but good working conditions, and the firm that treats its employees honestly and fairly, and that shows an appreciation of their efforts, is the one that is likely to have the best class of men waiting for a job. Given satisfactory conditions of labour, the workman will sell his skill to the highest bidder, though in doing this he does not necessarily sell his highest efficiency.

Workmen differ in character and quality at every point, no two having exactly the same efficiency in action. Pressure from trade unions having fixed minimum wages in most trades, employers are generally careful to select only such workmen as are capable of earning the standard or minimum rate payable. The standardising of wages, however, does not standardise efficiency. In effect it is more likely to have a tendency to lower efficiency, and if introduced into a business where men had previously been paid on the basis of efficiency, would undoubtedly have that effect.

Given a batch of men paid the same standard wage for similar work, conditions must inevitably be created which will have an adverse effect on efficiency. The most efficient men will naturally reduce their output to accord more with that of the less efficient, so as not to show too great a difference, even if they do not take advantage of the opportunity to reduce it for more selfish reasons. The standard of efficiency thus gets lowered to the level of the least efficient instead of being maintained at a high point.

The disadvantage of piece-work

Another disadvantage of this method of paying labour is the demoralising effect it has on timekeeping principles. Piece-work labour is in nearly every case highly specialised labour; that is, not merely skilled, but skilled labour applied solely to a single operation or class of work, with a consequent greater efficiency than the ordinary type of skilled labour which is spread over an entire trade. Such labour increases in value as it accumulates experience and skill in its individual operation, owing to the fact that high efficiency in the employee means a low expense ratio in the final cost. The best class of piece-workers are therefore of great value to the manufacturer. The difficulty is to get the best class of this kind of labour to maintain its efficiency under piece-work rates. Not being paid by time, the loss of an hour, or a day, makes little difference to a good piece-worker, especially if he or she can earn a good week's wages without much effort. As a consequence there is always a natural tendency for this class of employee to develop bad timekeeping qualities, which not only tend to disorganise the internal working of the factory, but also to increase the expense ratio all round.

Variations of the piece-work method of payment, as such, have been introduced from time to time, with a view to minimising many of the disadvantages of the system. Where these have been designed specially to meet the particular requirements of individual factories, they have frequently proved fairly successful. It may be taken as a general fact, however, that none of these special adaptations of purely piece-work methods of paying labour have any wide field of applicability in dealing with manufacturing as a whole, as they are one and all subject to limitations in one way or another; and none really eliminate the whole of the worst features of the piece-work system.

Labour unions

The standardisation of men and wages, again, drives them together into gangs or semi-mutual associations which present a united front against the employer. For

this reason employers themselves are largely to blame for the rapid development of trade unions as opposing forces. By endeavouring to standardise the workman and his wages, so as to make him a low-priced production unit, without consideration of his personality or his efficiency value, they have driven him into gangs which have naturally developed into associations for mutual interests. These again, by mere pressure of numbers and accumulated power, have forced the better class of men into line with them, and the whole range of workmen's efficiency has suffered in consequence. Thus the least praiseworthy phase of trade unionism has been created and fostered.

Against the principles of trade unionism generally the majority of employers have little objection. Many even favour them, and assist in their promotion. Every employer, however, objects to any outside influence that will in any way reduce the internal efficiency of his factory, and methods of all kinds have been tried with a view to increasing the efficiency of the workman in spite of trade union restrictions. Thus have come into being various forms of wage-paying, and methods designed to stimulate the interest of the employee in the business in which he is employed.

CHAPTER VII

THE LABOUR PROBLEM

(2) WAGES SYSTEMS • •

Time Payment : Piece-work : Premium Systems : The Halsey System : The Rowan System : Efficiency Systems

WAGES systems are numerous, but generally range themselves into three or four distinct classes. The oldest, and still the most general method of paying labour, is by a fixed sum for a definite period of time. This method has its advantages in many businesses, and under certain prescribed conditions proves satisfactory. It is the method generally adopted for the payment of executives and men who have merely a general value rather than a distinct and definable value for every detail of work they handle. It serves also in cases where a man's labour is of a fixed and definable quantity, as in the case of a watchman or an engine-minder, whose work is prescribed by conditions which vary little if at all.

In actual manufacturing, cost of production must be the predominant factor for consideration, inasmuch as any increase of production cost must necessarily come out of profits. Into production cost, labour enters generally as its biggest component part, and the aim of the manufacturer is therefore to keep labour cost within fixed limits, and to reduce it wherever possible so as to lower the production cost generally.

*Payment
by time*

When productive labour is paid under a daily or weekly rate, however, production cost is a variable quantity, dependent on the honesty and efficiency of the workmen and the character of the supervision they receive. When manufacturers had low labour costs and wide profit margins, this fluctuation of production cost created by time-rate payment affected them but little. But to-day, with competition on the one hand, reducing selling price and cutting profits, and on the other hand the power of the trade unions enforcing a standard wage rate, the modern manu-

facturer has to look elsewhere for methods of reducing production cost than to wage reduction.

The only way he can do this, since he cannot reduce wages, is to reduce the *rate* of wages per job, by the increase of efficiency on the part of the workman. This entails the provision of some method that will induce the workman to increase his efforts. Increased production, without consequent increase in expenses, will reduce production cost by reducing the expense ratio per piece handled. Consequently, the manufacturer can afford to offer financial inducements to the employee to increase his production, since by doing so he effects a saving on the cost ratio.

This fact has led to the introduction of several distinct methods of payment. The earliest attempt to overcome the disadvantages of the time-rate system was the introduction of piece-work rates. This had advantages from the manufacturer's point of view, since it fixed a standard wage cost per piece, and paid the employee solely on the basis of efficiency. The weakness of this system, however, is that however carefully rates are figured there must eventually come a time when they have to be reduced. Careful attention to the details of production will, in any business, produce improved methods which save time or material cost. A new tool or machine, improved handling methods, material that helps to reduce time and labour on certain processes—these and many other changes may be introduced that will save time and labour. If one manufacturer does not discover them, another will; the one who reduces his production costs can afford to reduce his selling price; and eventually competition forces selling prices down all round, thus compelling the other manufacturers to find some further means of reducing cost.

*Faults
of piece-
work
system*

To the average workman these finer details of cost reduction have little interest. He sees in a reduced piece-work rate, not a more equitable adjustment of prices to accord with improved methods of manufacture, but a penalty for extra efficiency on his part, imposed because he has increased his earnings to too high a point. Piece-workers generally, therefore, fix a safe margin of increase on their normal time-work earnings, beyond which they think it unsafe to go. This increase may be anything from 10 to 20 per cent., and no matter what production improvements are introduced, it will generally

be found that the piece-workers maintain their normal earnings at the same level as before. In this way the whole aim of the manufacturer in his effort to reduce production costs is frustrated.' When the most careful attention is not paid to piece-work details it frequently happens that production facilities increase, while piece-work rates and earnings are maintained at the same level as before.

A big labour dispute, fought on the question of an average of nearly 25 per cent. reduction in piece-work rates, came to a sudden end owing to the fact that the employers were able to prove that unskilled labour, under the new conditions, was able to earn more than the skilled piece-workers had been earning; and that the strikers had been deliberately reducing output all round in order to keep their earnings at a safe figure. The dispute and the loss on production that had taken place cost the firm their dividend for the year, and left a loss in addition—an exceptionally severe lesson in the 'advantages' of piece-work payments.

*The
Halsey
premium
system*

What was probably the next development in wage-paying methods came with the wide publicity given to the system advocated by Mr. Halsey, an American engineer, under the name of the 'premium' system. Premium systems of different kinds have probably existed during the whole history of time-rate wages; but Mr. Halsey introduced a premium plan, which was specially designed to eliminate both the disadvantages of the time-rate system and the piece-work system as well. Briefly, the system was based on the principle of allowing the workman a definite time-rate wage, and, by fixing a time basis for each operation, allowing him also a proportion of the value of the time saved on each job. Thus, a workman ordinarily paid sixpence an hour for a fifty-hour week would always be certain of getting his full 25s. so long as he put in the full number of hours.

Supposing he was in charge of a machine by means of which he could ordinarily turn out ten pieces per week, this would make the normal time per piece five hours, which at sixpence an hour would make a labour cost of 2s. 6d. If he reduced the time for the operation to four hours, the time saved, viz. one hour at sixpence, would be divided between him and the employer, a general basis for division being one-third to the workman and two-thirds to the employer, though in some cases an equal distribu-

tion was made.* The result of this was to increase the wage rate with the increase in efficiency, and reduce production cost at the same time, not only by reducing the labour cost per piece, but by reducing the expense ratio at the same time.

In many factories a system of expense distribution is used which distributes the entire departmental expense over the time each machine is in operation, a machine-hour rate of expenses being added to labour cost to ensure expenses being properly charged in the cost. This will be dealt with in a later chapter, and is referred to here merely in order to provide an illustration of the combined labour and expense cost saving effected under premium methods of working. As an example, a machine bearing an expense rate of 8d. per hour will be taken in conjunction with the labour example already referred to. The result will be as shown on page 184.

Thus, every hour's reduction in production time raises the workman's rate per hour, and at the same time reduces the piece cost by a shilling. The problem of eventual rate reduction enters into the operation of the premium system, however, just as it does into the operation of the piece-work system, though in a somewhat different manner. Under a piece-work rate, the workman gets the whole of the saving on labour cost he makes, while under the premium system he only gets a portion, the employer sharing with him the benefit of the labour cost reduction. The identical difficulty of effectually carrying out reductions in rates appears in the same way in both systems. To some extent this can be removed, though not always with complete success.

- A system which balances premium rates so as to automatically prevent the payment of any excessive rate, yet at the same time allows the workman the full benefit of any saving he effects up to a certain point, is one that is in use in many Scotch factories. This system—the Rowan system—generally carries a definite guarantee that no rate-cutting will be done, and this guarantee is made possible by the fact that once the workman passes the point where premiums reach a normal time-reduction, the rate automatically reduces itself.

Under this system the premium bears the same relation

* Under the original plan the saving was halved, but this was found to be, in some cases, an unsatisfactory division, and many firms subsequently reduced the allowance to the employee.

LABOUR						EXPENSE			Total Cost per Piece (excluding material)
Time taken Hours	Rate	Labour Cost	Premium	Total Labour Cost	Rate per Hour	Hours	Rate	Expense Cost	
	<i>d.</i>	<i>s. d.</i>		<i>s. d.</i>	<i>d.</i>		<i>d.</i>	<i>s. d.</i>	<i>s. d.</i>
5	6	2 6	—	2 6	6	5	8	3 4	5 10
4	6	2 0	2	2 2	6 5	4	8	2 8	4 10
3	6	1 6	4	1 10	7 3	3	8	2 0	3 10
The Premium System in operation, showing the decrease of cost per piece simultaneously with an increase in the rate of labour									

to the *ordinary* wages due for the time taken to complete an operation as the time saved bears to the time allowed. This results in a somewhat higher rate than the Halsey system gives (under equal division of time saved) up to the point when 50 per cent. has been saved, when the two rates are the same. Past that the Halsey premium keeps on increasing, but the Rowan premium begins to decrease, while maintaining at the same time a gradual increase in the per hour rate of wages. This can easily be seen from the following table showing the rates on a job where the time

		HALSEY			ROWAN		
Hours taken	Wages	Bonus	Total Wages	Rate per Hour	Bonus	Total Wages	Rate per Hour
10	s. d. 10 0	Nil	s. d. 10 0	s. d. 1 0	Nil	s. d. 10 0	s. d. 1 0
8	8 0	s. d. 1 0	9 0	1 1½	s. d. 1 7	9 7	1 2½
6	6 0	2 0	8 0	1 4	2 5	8 5	1 5
5	5 0	2 6	7 6	1 6	2 6	7 6	1 6
4	4 0	3 0	7 0	1 9	2 5	6 5	1 7
2	2 0	4 0	6 0	3 0	1 7	3 7	1 9½
1	1 0	4 6	5 6	5 6	11	1 11	1 11

allowed is ten hours. The simplest method of figuring premiums under the Rowan system is to multiply the time taken, time saved, and rate per hour together, dividing the result by the time allowed. Thus, in the five-hour job in the table the figures can be arrived at as follows :

$$5 \times 5 \times 1 = 25 \div 10 = 2\frac{1}{2}$$

The premium (2s. 6d.) thus bears the same relation to the ordinary wages due for the time taken (5s.), as the time saved (five hours) does to the time allowed (ten hours). In each case it is one-half.

The operation of the premium system in the biggest manufacturing plants has necessarily led to the creation of special departments to take care of the pricing and other details concerned. In these, many developments have taken place. It was found, for instance, that by fixing a rate too finely, the workman was penalised for any imperfections in the material he had to work. Thus, one workman may be fortunate and manage well with an

New methods created by premium payments.

allowance of half an hour a day for tool-sharpening or some similar necessary operation. Another, by striking a difficult batch of material, may need to take fully an hour or an hour and a half to keep his tools in order. Allowances made for such eventualities in a department of, say, a hundred men, meant adding costly margins to what might otherwise be fair and just rates. The result of this was to create different internal handling methods, which relieved the workman of responsibility for anything but the actual operation he was engaged for. Boys and labourers were engaged to take charge of every detail of the handling of the material itself, when not actually being worked on.

Full stocks of tools, maintained by the tool department in a condition ready for immediate use, relieved the men of any responsibility for tool maintenance. These, by compelling the workman to devote his time entirely to a single operation, made easy the estimating of finely graded labour rates. Purely arbitrary methods of rate-fixing, again, gave place to others based on scientific principles. Instead of the rate-fixer speeding up machines in order to fix a nominal time-rate for an operation, specially qualified engineers were employed to work out rates on formulæ. These men, knowing the scientific properties of materials and tools, were able to fix definite cutting speeds for certain tools under certain conditions of material, which would give the greatest efficiency. Rates worked out by men of this class were scientifically accurate, and as the final rate fixed was always one which allowed a fair margin of allowance for emergencies, yet prevented undue reduction of output by the employee, the system was widely adopted by the bigger manufacturing firms who used the premium system in handling machine workers.

Such scientific accuracy in rate-fixing is possible only in the biggest of businesses, and when the premium system in its original form is adopted by the small business, it must necessarily carry with it many of the disadvantages which methods of this kind prevent.

*Extra cost
for closer
inspection*

Piece methods of payment, again, while they may and do tend to reduce the expense ratio in one direction, necessarily increase it somewhat in others. Under time-rate methods, where no specialised method of production is followed, workmen are naturally careful in their work, and inspection can generally be carried out fairly efficiently by the foremen. Under specialised methods of manufacture, however, the experienced all-round foreman is

rarely in charge of a department in which he can follow this method. The specialisation of operations tends to split the department up into numerous sections, each probably dealing with an infinitesimal portion of the work. Thus, instead of five workmen handling between them twenty-five operations, which the foreman can generally review with some measure of safety five or more at a time, the twenty-five operations are handled by twenty-five different workmen, each working to gain time.

Unless some careful system of checking is adopted, stimulated production has a tendency to reduce quality of workmanship, owing to the fact that the higher rate of speed in working leaves the workman less time for the careful consideration of points of accuracy and quality. Consequently, under any system of piece-work payment, whether of the ordinary kind or not, the inspection of parts after each operation needs to be carried out as far as possible in order to stop any faulty workmanship before the part has further labour wasted on it. Such inspection is practically impossible without the employment of a special staff to deal with it, as it is not only too great a task for a foreman under ordinary conditions, but, in addition, the increased number of details he must attend to will prevent him from devoting much attention to anything but supervision and the control of his clerical records. This addition of an inspection system, therefore, adds to the cost, and justifies the bigger share of the saving on labour cost under premium methods being taken by the employer.

Neither piece-work, time rates, nor premium methods alone will meet the entire requirements of the majority of manufacturing plants, and it frequently occurs that four or five different systems of labour payment will be found in operation in the same business. This not only presents many difficulties in handling the clerical records, but also prevents any definite basis being reached under which costs can be brought down to some measure of standardisation. This fact has led to the introduction of systems based on general efficiency, instead of the varying efficiency of individuals. *Efficiency systems*

Systems of this kind are not only fairly numerous, but differ widely in character, being chiefly designed to meet special requirements and conditions. They are generally planned with a view to avoiding the disadvantages of the more general methods of labour payment, and at the same time consolidating the entire manufacturing organisation

under a single method which uniformly affects the whole working force. Their efficiency depends to a great extent on the nature of the business handled, as, in fact, does that of any system of labour payment; but generally speaking, methods of this kind have a far wider range of applicability than the others, and have the advantage also of being easily applied to the smallest business.

'Efficiency' systems reach their highest standard of efficiency where employees of all classes can be paid equitable values for their nominal time or labour. Their best foundation, in fact, is the payment to every employee of a wage or salary commensurate with his special ability or value. This provides a labour rate which, if the department or individual responsible for selecting and rating employees is expert, is at least approximately accurate, and to some extent helps to standardise costs, owing to the fact that it is based on an approximate standardisation of labour values.

Past this point efficiency systems vary considerably, and merely the general outline of their main principles can be followed. These are generally based on the standard efficiency of a section or of each individual, calculated on the payment made for a normal amount of labour. In the case of a factory where individual operations can be closely classified, the basis of calculation would naturally be a normal labour value for each operation, similar to the basic rates used in the premium system.

The essential difference between the two systems is that whereas under premium methods of payment the employee must necessarily know the rate he is working against, under efficiency methods time saved is not the only basis for extra payments, with the advantage to the employer that, not being influenced by time only, the workman devotes more attention to the quality and efficiency side of his work.

*Efficiency
records*

In making up efficiency records, individual times may or may not be taken wholly into account, according to the class of work done. In any case, individual efficiency is always taken into account in some way or another. Faulty workmanship, tardiness, carelessness, or anything which depreciates the efficiency of the employee as an individual, goes against him on his individual record. In some cases he may have to pay direct for spoiled work out of his weekly wages. Generally it means not merely a reduction of his efficiency record, but a financial loss as well, affecting his

income in one way or another—if not directly, then indirectly through his bonus payments.

The making up of efficiency records must be based on approximate values, whether they deal with time saved on operations, time lost, carelessness, or anything else. The entire range of details affecting a man's efficiency can thus be valued and charged either to his debit or credit. This is generally done on a percentage basis, or by allowing a certain number of marks for a definite value. The same principle can be followed in dealing with a complete department, and the most general practice is to charge to the individual only the most important items on which individual responsibility can be closely prejudged, everything else being charged to the general efficiency of the department.

Any increase in efficiency under such a system takes into consideration every detail of operation, and covers not merely labour, but general expense, and, in fact, the whole range of details covered by cost of production. Under a premium method of payment, for instance, a workman would still receive a high rate of pay if the department in which he worked was being operated on such a small staff that departmental expenses were wiping out every cent of profit. He would not, in fact, be concerned with the general efficiency of his department as a profit-earning machine at all; and while a manufacturer may accept generally the principle of increased payment for increased labour, there is a point in operating costs where expenses make profitable operation impossible, and where the whole burden of the loss falls on the employer.

By making every employee directly interested both in the efficiency and the earning power of his department, a valuable link of joint responsibility is forged between capital and labour, which has far-reaching results. Thus, while the mere standardisation of wages drives employees into gangs for mutual co-operation for personal benefits, a system of this kind links the employer and employee by joint interests which operate for the benefit of each without interfering in any way with the individuality of either. • •

The greatest benefit that accrues from such a system comes from the fact that it brings into play the personal influence of the best employees, which is exerted in influencing the less efficient to work more efficiently for the benefit of the whole, and thus achieves a most desirable

*A closer
link be-
tween
capital
and
labour*

end in bringing into action for the benefit of the entire business the personal influence and brain-power of every employee. It provides, in addition, a most equitable method of distributing not only responsibility, but also individual financial interest in the business. In this respect it differs from any of the ordinary forms of profit-sharing, whether they are based on final dividends, turnover, or combined efficiency. Such systems fail to take into account either departmental or individual responsibility.

The department that causes a 1 per cent. loss shares equally in the profit distribution with the one that creates a 5 per cent. gain; and the workman who depreciates the efficiency of his department also shares equally with the man whose ability and personality has increased its efficiency. Under profit distribution based on the general outline of efficiency methods described, however, both the individual and the individual department are penalised for their own deficiencies, while any financial interest in the business above ordinary earnings is distributed equitably according to the individual efficiency of each.

CHAPTER VIII

THE LABOUR PROBLEM

(3) PROFIT-SHARING AND BETTERMENTS

Profit-sharing and Copartnership Schemes : The Weaknesses
of Ordinary Methods of Profit-sharing : The Efficiency System :
Betterments : Personality in Handling Employees

INDUSTRIAL copartnership, permitting in some way or another a share of final profits to labour over and above the wages paid, has been the subject of a great amount of discussion and experiment during the past quarter of a century. In many cases systems have been adopted with considerable success, and have been operated for a great many years without any necessity for change becoming apparent. In other cases, however, they have failed to achieve their object, either to the satisfaction of the employer or employee, and have been condemned in consequence.

Lacking any definite or generally accepted policy on which to base methods of profit-sharing, most employers are satisfied to leave well alone, and to operate their businesses under the tried methods of the past, adjusting them to suit conditions as may be found necessary. It is, nevertheless, an accepted fact that some readjustment of the relationship between capital and labour must be devised if they are to operate together to the best advantage under modern conditions. For the two to be always at daggers drawn, or even nominally working together satisfactorily yet each anticipating a time when a dispute will arise, must create a continuous element of friction that cannot fail to affect the efficiency of a business. *Reasons for new methods*

Supported by labour unions, workmen are ever pressing for a greater and still greater share of the earnings of businesses. This pressure is applied at a point which seriously affects the employer, viz. wages. Forced downwards by competition in his attempts at profit maintenance, it is only by reducing or preventing an increase in production

cost that the employer can maintain his profits. Anything which tends to increase production cost must therefore make the problem of profit-making more and more difficult ; and as labour is generally the biggest component of cost, the seriousness of pressure at that point cannot be over-estimated.

*Profit-sharing
and co-
partnership*

Profit-sharing and copartnership schemes endeavour to overcome this difficulty by maintaining a standard rate of wages and dividing a portion of the final profits with the employees. Profit-sharing schemes usually allot a fixed proportion of profits to the employees, or those having a certain minimum record of service with the business, to be distributed in proportion to their ordinary earnings. Copartnership schemes, on the other hand, make certain employees actual partners in the business by permitting them to become shareholders, their holdings generally being acquired through the investment of their share of the profits in the company's stock or shares. In some cases they are allowed to withdraw a fixed proportion of their profits for specific objects such as house-purchase, which are in themselves in the nature of permanent investments.

Employee-shareholders in a business have also full voting power according to their share holdings, and frequently have a representative on the board of directors. In this way they are given an actual financial interest in the business, and some measure of control in addition. Systems of this kind have been worked successfully by the big gas companies, notably by the South Metropolitan Gas Company, where it was introduced by the late Sir George Livesey in 1889 and is still in active operation. In this case employee-shareholders are given definite time-contracts with the company, which are only renewed in the case of satisfactory workmen, and which, if a workman proves in any way inefficient, may be withdrawn or modified, the employee having the opportunity of regaining his position as a shareholder-employee by an increase of efficiency. Failing that, he loses his position altogether.

Attempts to introduce such systems into other trades, however, have met with varied success, and in some cases have resulted in absolute failure. Generally this has been caused by the attitude of the trade unions, which have regarded plans of this kind, formulated in order to prevent labour disputes, as an insidious method of limiting their power, and as an attempt to prevent concerted action on the part of employees.

Nearly every scheme which aims at profit-sharing has a distinct weakness in that it either presumes, or attempts to enforce, thrift on the part of the workmen. Unfortunately, while a proportion of employees may be thrifty and appreciative of an opportunity of accumulating savings for the future, it would probably be safe to say that the majority are not so inclined, and that to them a shilling in hand in their wages has a better appearance than a pound locked up in unsaleable shares. Where a permanent staff is employed, which rarely changes, profit-sharing or copartnership principles may succeed. But where the ordinary type of employee is in the majority, and where the men employed are constantly changing, it is difficult to operate such a system, especially if it entails the locking up of earned capital.

*Essential
weakness
of copart-
nership*

As an example of this difficulty, one well-known copartnership firm, after fourteen years' operation, only had an average investment of a little over £50 per head in the business from all its employee-partners. At 4 per cent. this represents a dividend of £2 per annum, only a portion of which was actually available to the employee in cash. And as a number of participants had less than half this average amount invested, their immediate interest in the profits can be imagined. Yet this has proved one of the most successful examples of copartnership, and is frequently referred to as a typical example of its success.

The success in this instance, however, has been assisted by internal conditions which are not common to manufacturing businesses generally. Chief among these is the enormous proportion of unskilled or semi-skilled labour employed, coupled with efficient co-operation between businesses in the same line in dealing with each other's employees, thus giving a control over labour not generally possessed by ordinary manufacturers. There is also a lack of direct competition in the business, which permits of different methods of management from those necessary to ordinary manufacturing businesses, while conditions generally favour permanency of employment to the majority of the employees.

Investigation of successes and failures in dealing with labour on profit-sharing principles, in fact, proves that the methods commonly used have a very limited range of applicability, and that success can only be achieved by the careful adaptation of any scheme to the requirements of each individual business.

*Trade
union op-
position*

The idea behind all schemes of this kind is to conciliate labour and to prevent disputes. Once the antagonism between labour and capital is overcome, there is an opportunity for developing a greater measure of co-operation between the two, so that each works together to a common end—efficiency. On the one hand, labour unions are striving for a standardisation of labour which must inevitably tend to reduce the efficiency of the best men to that of the average. On the other hand, employers are looking to profit-sharing in some form or other to develop the efficiency of the best men, and through their influence to raise the efficiency of the whole staff; while, by making the employee financially interested in the efficiency of the business, he is induced to take a greater interest in its success, and to regard the disorganisation resulting from a dispute from a different outlook than he would as a mere producer at a fixed wage.

Most methods of profit-sharing fail to achieve these objects at some point or other. In many cases a man will disregard the equivalent of a few weeks' wages invested in the business when considering the question of an increase in his actual weekly earnings, and the nominally small amount the average workman would accumulate as a financial interest under ordinary profit-sharing principles is not usually of great influence in preventing disputes.

Far greater success has been obtained on the Continent than in Great Britain in dealing with profit-sharing principles, but this has undoubtedly been achieved owing to the greater permanence of employment in the trades and businesses in which the principles have been applied than in similar businesses in this country.

*A conti-
nental
scheme*

A method adopted by a famous continental firm in dealing with the profit-sharing problem varies somewhat the general principles of the systems advocated. This firm had the advantage of a big legacy, left by a former owner of the business as a fund for the benefit for the employees, and on this capital basis the system was built. Interest on the original amount, and a share of the profits of the business, are allocated each year for distribution. An employee who is proved efficient over a certain period becomes entitled to participate in the fund, and has a definite amount allotted to him. The employees, however, have no personal rights over the fund, which is maintained under stringent conditions as to distribution, and is managed by a committee of employees, who are bound to regard

the original trust deed, and cannot deviate from its conditions.

While financial interest is controlled in this way, the employees' interest in the management is secured by allotting to them voting power up to a certain point. In addition, every employee is eligible to serve on the directorate, and, in fact, the principal heads of the business at the present time are old probationers of years gone by, who have been appointed by the votes of their fellow-employees.

The employees are thus financially interested in their own efficiency, and in the success of the business as a whole, and while compulsory thrift is a feature of the system, it is not the only feature, and is not depended on as the sole bond between employer and employee.

It is possible that only through combined methods, in which the salient features of the various experimental systems of the past are incorporated with newer ideas, and the whole specially designed to meet individual requirements, will much of the great problem of labour unrest be solved.

A simple basis which has been occasionally recommended by the writer, with modifications to suit individual requirements, is as follows : *The 'efficiency' system*

Labour payments are based on efficiency principles. Thus, where no standard rate is paid, the rates of wages are based on carefully kept efficiency records ; but where a standard rate is enforced, bonuses are paid for increased efficiency, departmental heads and all indirect labour sharing in such payments by percentages. Probationary periods are fixed during which employees are credited with half their efficiency bonuses, but are not permitted to draw them. It is generally found that a man's efficiency is greatest when he is new in the business, and for a time at least needs little artificial stimulation. Later, his bonuses are increased to the full allowance, of which he is permitted to draw half with his wage, the balance being credited to him.

The bonuses are based on actual savings effected by increased efficiency, which are equitably divided between the business and the employee in the case of ascertainable time-saving, and in the case of general efficiency are based on departmental results, an equitable proportion of the gain being distributed over the staff according to position, with reductions for inefficiency points against the

employee, and extra allowances for specially good efficiency records.

In this way every employee shares in the efficiency of his own department, and by reducing the actual cash payments made, there is less danger of reduced output on the part of specially efficient men who are capable of earning considerably more than the average.

A real co-partnership

The system is based on a fair remuneration for both labour and capital, and a reasonable interest on all capital invested in the business is treated as a permanent charge against the business in the same way as the cost of labour is treated as a charge. After all charges have been met, the balance of profit or loss is divided in agreed proportions between capital and labour.

The labour share of profits or losses is distributed on an efficiency basis, both departmental and individual efficiency being taken into account, and profit or loss margins are credited or debited to each employee's account. These allowances, and the balance of the employees' efficiency earnings, are treated as 'employees' capital,' and the actual balance of this shown carries the same interest as the other capital invested in the business and the same voting power. The employees interested in the scheme elect their own representatives to attend the general meetings of the company, or, in the case of private businesses, a committee which acts as an independent link between the employer and the employees.

Subject to a satisfactory record being proved, an employee has permission to withdraw a certain proportion of his capital in cases of illness or other urgent necessity, and once a year may withdraw the equivalent of one week's wages for holiday purposes. He is not entitled to do this, however, until he has a clear twelve months' service to his credit; but after five years' service he may withdraw a greater proportion, and, if he wishes, may secure one-half his available capital by having actual shares in the business issued to him.

Regulations affecting distribution

All balances 'in the fund' are subject to conditions which demand efficient service from every employee. Insubordination entails loss of all credit in the fund, and any balances thus forfeited are distributed over the remaining employees in equitable proportions. Regulations affecting resignation and discharge are also enforced, but in all cases of dispute an arbitration committee has the final word in the matter.

Experience has proved that the majority of employees disregard any invested and unusable profits when reckoning up their earnings, and by paying them half their bonus they are stimulated to further effort than they would be if the whole amount was paid to them, with the possibility of it reaching what may to them appear a prohibitive point. On the other hand, an employee who is nominally entitled to an amount which is fairly large—at least to him—will think twice before participating in insubordination which will cost him that amount, and which, even if he wins a nominally higher rate of pay in consequence, will not benefit him finally, as his new rate of pay will not be likely to reach the amount of his actual earnings at the old rate plus the efficiency bonus.

Further, as he participates not only in the profits of the business, but in its losses also, he is personally interested in preventing any disruption that may create a loss on the year's working, and in this way the sympathies of the old employees are brought over to the side of the business, and their influence in preventing internal disputes is obtained.

A great number of manufacturers object to schemes of copartnership and profit-sharing on the basis that they entail a considerable amount of extra book-keeping, and, in addition, give the employees a knowledge of the confidential side of the financial operations of the business. The manufacturer of this type fails to realise that extra labour created in order to increase efficiency, prevent disputes, and ensure continuous and profitable working of a business, is quite as justifiable as the maintenance of machine, or cost or labour records, which represent expenditure directed to similar ends. So far as the other difficulty is concerned, all that employee-shareholders demand is accuracy in the making up and distribution of profit and loss, and this is easily assured by the appointment of independent auditors who can verify the figures on behalf of the employees who participate in the profits.

Employers differ considerably regarding the various policies which come under the general term of 'betterments.' This term is used to indicate any special conditions or facilities which are provided by an employer for the purpose of bettering the conditions under which employees work, or which are designed to influence and improve their private life, but which are outside the scope of what might be termed 'necessary' provisions.

It is a generally accepted fact, however, that betterments

'Betterment' schemes

are of little relative value to either the employer or the employee unless they are based on sound business policies. In any business, care for the employee as an individual is desirable up to a certain point. Better lighting, ventilation, and catering accommodation may not be demanded by factory regulations, yet may nevertheless pay big dividends in increased efficiency.

The great danger in introducing betterment schemes is that they may become oppressive to the employee owing to their indirect interference with his individuality. Such a possibility should be avoided at all costs. Even when a business provides an estate to ensure good living accommodation being obtainable at reasonable rates, it is advisable to remove its direct control from the factory itself, and vest it in a private company which can deal with the employee as a private individual.

In the same way, social arrangements made for the benefit of the employees should, as a rule, in no way be made obligatory, or even be given the appearance of such a condition. Many social festivities prove valuable by creating a closer bond between the entire staff, from the executives down to the juniors, and by enabling employees to realise that while business is business, business men are, after all, human beings with human sympathies and appreciations.

Personality in handling employees

Personal influence is perhaps the greatest stimulant to efficiency that there is, and personality in handling employees counts for more in carrying a business to success than all the control and production-increasing systems in existence. The average workman needs a leader, a man he can understand and who understands him. And just as men will follow a good officer against fire and sword, so also can they be led to follow a good employer or manager, and to stick to a business through thick and thin, while always giving it their best.

If men find better leaders outside their business than in it, and if they have to enforce even elementary conditions of labour from an employer, they cannot be made either efficient workmen or a support to the business that employs them. Their mechanical efficiency may be purchased or enforced: but their mental and moral efficiency is outside any question of money payment or factory regulations, and is only to be developed by good conditions of labour and by a close personal connection and understanding between master and man.

For this reason betterment schemes, when handled by a man with a sound knowledge of the labour problem, and with a personality that appeals to the workman, are of the greatest possible benefit to a business. Only when they are mismanaged by domineering and unsociable executives, or made the subject of restrictive and objectionable regulations, do they fail to achieve any means of success. .

CHAPTER IX

PRODUCTION

(1) CONTROLLING OUTPUT BY SCHEDULE

The Value of Scheduled Production : The Main Output
Schedule : Planning Production Ahead : Schedule Charts :
A Practical Example

EVERYTHING concerned in factory construction, organisation, and management centres around one point—production. This is the result at which all energy is directed, and, just as it is the main point, so also is it the most intricate point in manufacturing. Volumes could be written on this single subject without exhausting its possibilities, and the space that can be allotted in the present volume will permit of little more than a brief review of its main features and the principles underlying its most efficient management.

Manufacturing and power production In many ways a manufacturing plant closely resembles a complete power plant. Just as a badly designed shafting will result in constant waste of power through increase of the friction load, so also will a badly constructed organisation result in waste at every point through the friction it creates.

A good organisation is the directing force of production, eliminating waste and friction, and distributing the working forces of the factory to the best advantage. But just as the best power-distribution system will fail to achieve its object unless the power itself is efficiently controlled at the engine and at the boiler, so also will the best internal organisation fail unless it is under proper and efficient control.

It is just as necessary to regulate production as it is to regulate the power of the steam-engine to meet the requirements of the machinery that is running. To allow a factory to produce without some safe method of controlling and regulating production is equally as bad as trying to run a steam-engine without a governor. In both

cases the result is not merely wasted power, but irregular and inefficient working. The governor of the steam-engine keeps it working at a normal speed and regulates the power developed to meet only the actual requirements. Consequently, it uses just the quantity of steam it requires, and no more; and no matter what the pressure behind, or the conditions before, may be, it maintains the required power production with a minimum of waste.

Many businesses are very much like a steam-engine that lacks a governor. With them, production has no regularity, but is solely dependent on the order department. One of the commonest practices in manufacturing, in fact, is to regulate production to fit the immediate orders in hand. Consequently, we find big plants paying heavy labour charges for overtime during several months of the year, while for many months they will work with half their normal staff, paying at the same time a proportionately exorbitant rate of expense on everything they produce.

Production engines need a governor

In one plant the difference between the extremes of the labour employed has been as much as 75 per cent. from the normal. That is, it has at one period of the year been operating with 25 per cent. more employees and at another period with 50 per cent. less employees than its normal average for the year. It was operating without a governor on the production engine.

Such erratic methods of operation rob profits at every point. Where the labour-supply is limited, the constant changing of employees lowers efficiency all round, in addition to keeping the best class of workman away from the plant. Extra payments for overtime, again, add an appreciable percentage to labour cost for the year; and a 'slack' period means an increased expense per job that can easily turn profit into loss. That an 'overtime' period may compensate for increased labour cost, by the reduction of operating expense, is agreed; but, omitting very exceptional cases, no factory can work overtime for the whole year, and the inevitable 'slack' period always shows a loss on operating that the overtime period can never compensate.

The ideal production system is one that will maintain output at as near a uniform level as possible. Certain businesses, of course, have what is known as a 'season' trade; and the bulk of their orders may be booked during only a few of the twelve months of the year. Even in such cases, as has often been proved, erratic production

is not necessarily a *sine qua non*, and in every case efficient control can relieve the overtime pressure and distribute production more equitably.

*Planning
production
ahead*

The great problem in controlling production is to plan ahead, and the great necessity is an ability to estimate future requirements. Given merely an approximate knowledge of the demands that will be made on production for only a few months, the factory manager can distribute his work so as to provide a well-balanced production schedule. By this means he regulates the varying pressure of demand, as created by the sales department, in its influence on production.

Competition demands not only promptness in delivery, but a low and controllable production cost. Together, these demand a high efficiency in factory organisation, and it is no more possible to get the highest efficiency out of a factory which is constantly subject to the varying influence of demand, than it is possible to get the highest power efficiency out of a steam-engine that lacks a governor.

The day has long since passed, when a manufacturer could arrange his work for the day, and leave to-morrow to take care of itself. Nowadays, he must be able to operate at a minimum cost, while giving the maximum of service to his customers. To do this, he must control his production so that it will meet all demands that may be made upon it, yet operate normally and efficiently in spite of their fluctuating character. As a consequence, he cannot leave to-morrow to take care of itself. He must plan ahead, and be able to forecast to-morrow's demands, so that he can maintain a balanced production ratio that will prevent waste and loss.

*Production
schedules*

This necessity for constant foresight in manufacturing has brought into being the factory schedule—the governor of the production engine. Production schedules are of infinite variety, and differ according to the character of the business in which they are used. In all cases, however, their basic principles are the same. Their use enables the manufacturer to plan his business months or years ahead—to balance his production to meet both present and future demands—and to get a maximum output with a minimum of friction and at the lowest cost.

So far as they apply to standard products, every detail of manufacturing that is directly concerned with production can be scheduled, and brought down to a definite basis. Even in businesses which do not manufacture

standard lines, but which are devoted to the manufacture of specialties, or which have a varying class of production that is never continuous, schedules have been used with good effect in handling minor details.

It is in the general manufacturing plant, however, where definite classes of products are produced continuously, that scheduled production reaches its highest point of efficiency; and the principles underlying scheduled production in such businesses apply to the preparation of schedules of a less important character in all classes of businesses.

To estimate what is to come in the future, one must know what has happened in the past, and continuous records of sales for several years past are the best basis for scheduling possible sales in the future. Future demands, of course, will be subject to many influences that past sales will not show, and it is therefore vitally necessary that any estimate of future demands be made up by some one who has an intimate knowledge of the markets in which products are sold.

Where a sales manager is employed, his estimate of future sales should always be taken as a basis on which to plan future schedules; but these may be subject to modification by the executives. Generally speaking, the two most important men in the designing of a production schedule, as applied to total output, are the sales manager and the factory manager or technical executive. Together, these two have a thorough knowledge of selling conditions based both on market conditions and on technical requirements; and either on their joint estimate, or on the final estimate of the sales manager after consultation with the manufacturing heads, some safe sales schedule for the future can easily be planned.

Where types or designs are constantly changing, any production schedules must take into consideration the likelihood of a type being superseded; and danger-points of stock production must be fixed so as to prevent the manufacture of surplus stock which may be difficult to dispose of if an improved type of article or machine has been introduced. Apart from this point, it is always necessary to fix a stock limit so as to avoid overproduction of any one line. The planning of a schedule, therefore, must be on the lines of safe production margins.

The best method of planning production is by means of charts. While carefully arranged sets of figures will tell

all that is necessary regarding production, they need careful and constant analysis if every important detail they reveal is to be kept under review. By the use of charts, however, every detail regarding production and the various production schedules can be kept under review every hour of the day, and a glance at a chart will often reveal some vital variation in results that the most careful analysis of figures would not bring to light.

*Schedule
charts*

Production schedule charts are generally made up on the simplest lines, being, in fact, the original type of chart form consisting of simple lines running across the page to show the increase or decrease of sales or production. The relation of these lines to each other provides the means of comparison which is necessary to a thorough understanding of the results they cover.

Chart forms, specially planned to meet many of the varying requirements of production schedules, are dealt with in other sections of the present volume. A simple chart form can be used as a basis for scheduling production. The estimated demands on production for the year are first carried across the chart, the weekly totals being cumulative. The estimated capacity of a factory in dealing with its product not being constant, the period is split up into sections, and the scheduled ratio for each period noted separately. In this way both the estimated output for each individual week, as well as the cumulative output week by week, can be shown. Against these, actual production is entered as the weekly records are made up.

Separate records have to be maintained of weekly stocks in hand, together with scheduled production for the following week, and these are checked against the production schedule and the actual orders received.

If it so happens that demand, for some unexpected reason, is gaining on the schedule, the production schedule itself must be altered. To meet such emergencies, most factories where production is on a schedule basis issue all factory orders in batches, to cover only a short period of time. The schedule charts are then made up either with a pencil line to show estimated requirements, or with a light-coloured ink line, either of which can easily be superseded by a distinctive line to represent the final schedule estimate as made up from time to time.

It is advisable to leave the original estimate line on the chart in any case, as it is useful when the next schedule is prepared, in showing how closely to actual requirements

the previous estimate has been, and in this way helps in forecasting a more accurate schedule the following season.

Carried out over a period of years, charted schedules of estimated and actual requirements are the best possible basis on which to plan for the future; and indicate in an unmistakable manner the course of sales. Frequently they are also of inestimable value in locating the pressure points in businesses which are in any way affected by seasons; and in such businesses a chart record of progress for even a single year will provide vital information on which to base the work of succeeding seasons far better than the sets of figures the chart records represent.

Value of scheduled production

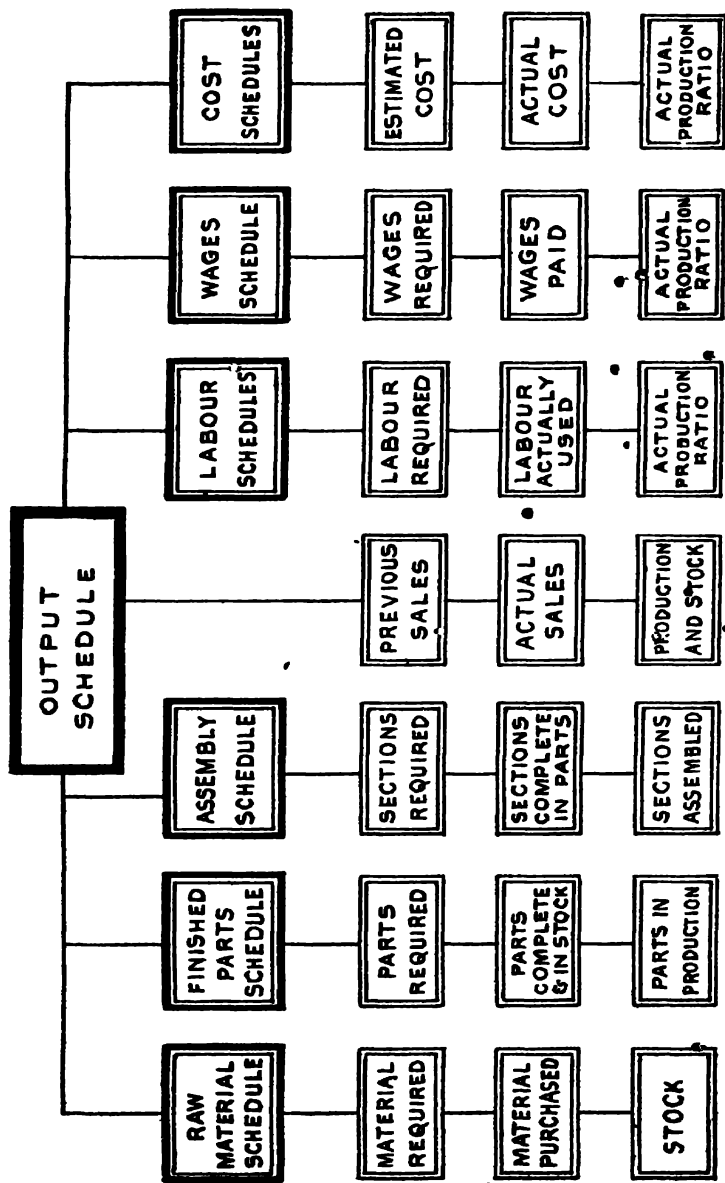
The scheduling of production, though most necessary in regard to final output, cannot be carried out efficiently on the final output alone. It must cover every important detail in connection with output. The great danger in production at any time is the manufacture of a dead surplus which has never a realisable value equal to its cost. While, on the one hand, the manufacture of a certain part in large quantities will reduce production cost to a minimum, there is, on the other hand, the possibility that a change in style will make the parts useless and reduce their value to that of scrap metal.

Another feature of increased part production that is carried out in order to reduce final cost is the amount of capital it locks up in dead stock -- and it is no uncommon condition to find, on close analysis of manufacturing businesses, that hundreds and even thousands of pounds of capital necessary to business development is locked away in the stores in the shape of manufactured parts that are either useless or that cannot be used for months or years to come.

Scheduled production, if it achieved no better object, would be entirely warrantable if it prevented such a state of affairs. Properly planned, it will not only prevent this, but it will add an all-round increase in efficiency to the plant that no other method will achieve.

So vital to successful management have the principles of scheduled production been found that in many instances entire manufacturing plants are operated solely by schedule. In one case a big machine-tool factory has found that by operating in this way it more than trebles its normal efficiency under other systems of working, in addition to being able to operate on a capital margin that many

How scheduled production works



THE VARIOUS SCHEDULES WHICH MIGHT ORIGINATE FROM THE MAIN OUTPUT SCHEDULE IN A MANUFACTURING PLANT,
SHOWING THE NECESSARY INFORMATION REQUIRED TO MAKE EACH EFFECTIVE

businesses less than half the size would find it difficult to do business on.

This firm schedules its production week by week, and with the exception of a fixed minimum of spares for repair purposes, never manufactures any part of a machine unless the remaining parts are on order. This rule does not cover such standard parts as bolts and screws, which have always a definite stock value, and are therefore realisable assets. All other machine parts, however, are scheduled. Each week the requirements for the following week are estimated, and orders are issued for the number of parts required to complete the machines scheduled.

Close analysis of the business has enabled the managers to predetermine the capacity of the various departments, and to know to a small margin the number of employees necessary to carry out any definite amount of work. On this knowledge a departmental bonus scheme is based, and whenever there is any call for increased production beyond the normal capacity of the departments, this comes into operation, and enables the firm to meet the increase with its regular employees, instead of constantly varying the labour employed to meet the changes in production pressure.

Continuous knowledge of the variations in demand, again, enables the managers to maintain a balanced production, which, during slack periods, produces just the kind and quantity of stock required to relieve the increased pressure of the busy months.

As a consequence, and in spite of the widely varying demands in every section of the business, the factory is kept operating at an almost uniform pressure during the entire year, thus retaining the best labour, and maintaining a normal production expense ratio which enables cost to be kept at a minimum.

Such a system, while by no means possible to all manufacturing businesses, yet indicates the basic principles of scheduled production, and their advantages over the erratic production so common to manufacturing businesses. In this, as in every case where scheduled production is carried out in the best manner, every detail of production is taken into consideration. This entails the preparation of separate schedules to cover a variety of important details, all of which influence the final output.

CHAPTER X

PRODUCTION

(2) DEPARTMENTAL SCHEDULES

Part Schedules : Labour Schedules : Material Schedules :
Financial Schedules : Correlating the Schedules : Departmental Schedules : Floor-planning Schedules

THE preparation of the output schedule has already been dealt with. In addition to this, departmental schedules must be prepared, so as to maintain a proper production balance between the various sections of the factory. In the manufacture of machinery this is fairly simple, as part lists have always to be prepared which show the quantity of each part necessary to produce a complete machine.

These schedules From the part lists—or in other lines of manufacturing from an analysis of the constituent parts of the product—part schedules can be prepared. The charting of part schedules is best carried out by means of coloured charts which cover all the constituent parts of a machine or machine section on a single sheet. The use of these is explained in a later chapter.

In the preparation of part lists, or their equivalent, material must be closely analysed. This is easily done by the addition of separate columns for each class of material, in which are entered the weights of the parts required for a single machine. From these records it is obviously a simple matter to prepare material schedules that will provide basic information for the buying department. Scheduled production has a great advantage in this respect, as it provides the buying department with an approximately accurate statement of future requirements, which, in businesses where raw material prices are constantly fluctuating, ensures the best possible use being made of market opportunities.

It has a similar advantage on the labour side also. Figured on a percentage basis, the labour employed has

a direct relation to output. In most businesses it is even possible to estimate the amount of each class of labour required to complete a certain amount of product. This is especially the case when standard products are manufactured, and where labour costs on each are closely analysed.

From the output schedule, therefore, a labour schedule *Labour Schedules* can be prepared, which will indicate the normal labour-supply necessary to carry out the schedule. Comparison of the scheduled estimate and the actual labour employed will then immediately indicate any undue increase, which, if not justified by some variation from schedule as shown by the actual production, can be investigated.

This necessity for closely analysing labour becomes more real as the knowledge imparted by schedules increases. In one exceptionally serious instance, close analysis of labour costs resulted in changes which reduced production costs by nearly half, in addition to cutting over £700 a year off the cost of non-productive labour. In another business, a 50 per cent. increase in production was obtained without any increase in labour cost. Yet in both these cases there was never any question as to the efficiency of the personal control over the employees or the capabilities of the foremen.

Labour waste is a loss which has to be exceptionally prominent to be noticeable through personal contact only; but by close analysis and comparison its intricacies can be traced and brought to light. A simple chart will show week by week the relation between the employees on productive and non-productive labour, and these again can be compared with wages paid. In this way a comparison is obtained between the amount and cost of each class of labour.

In scheduling labour, much will depend on the character of the business. In some cases departmental labour schedules could be prepared which would link with the departmental production schedules. In others, the varying character of production might prevent labour being scheduled on a production basis, except perhaps by a simple percentage method which would show the approximate relation between labour cost and quantity, and total or departmental production.

Factory finance plays an important part in the making *Financial* up of labour and all other subsidiary schedules, and very *schedules* frequently a financial schedule will have a great influence

on the preparation of the labour schedules. The financial question is, in fact, the main influence in nearly every case, as it covers the capital likely to be available during a period, and thus regulates the expenditures of the business, whether on labour, material, or current expense.

All schedules, of course, are, in reality, figures, and charts are only used when the figures can be simply displayed in such form. It is frequently a difficult matter to chart a financial schedule owing to the intricate character of the business. Whether this is possible or otherwise, a financial statement should always be prepared that will help to control to some extent the scheduling of details which entail expenditure.

A very common error in handling a manufacturing business is to regard cost of production as having prior claim to everything else; and, in consequence, it often happens that a factory will be using capital to produce and lay aside stock at low cost that would earn dividends if devoted to business development; while the seeming saving on production might easily be, and often is, wiped out by the interest on the capital invested and the depreciation in value of the stock produced.

The numerous sides to the question of factory finance thus entail an enormous amount of care being taken to adjust production so that the capital invested in the business shall pay profits on the investment; and all schedules prepared for the use of the factory must therefore be based on sound finance and be kept closely related to the financial schedule.

*Special
executive
conferences
on
schedules*

Here can be seen the vital necessity for an executive department which can analyse all the different sides of the question of output and plan the work of the factory to the best advantage. No single individual, even in a small manufacturing business, could schedule its future production on a profitable basis without the assistance of men fully versed in the requirements and limitations of different sections of the business; and when these men are controlling forces in an organisation and, as a consequence, are directly interested in anything that will affect the efficiency of its constituent parts, fine adjustments in operating schedules can be made that will cut waste and increase profits at every point.

It is especially necessary to bring into any conference on output or management schedules the heads of production departments, whether they be executives or not.

Departmental production schedules are by no means the least important of the necessary estimates that must be prepared; and it frequently happens that internal adjustments can be made in the departments that will provide for increased production without greatly increased expenditure, yet which no clerical records would discover.

Department managers and foremen, with their knowledge of the men and machinery under them, can often point the way to an increased production or an elasticity in departmental output that can be taken advantage of if necessary, and which might, ordinarily, necessitate either increased machinery or labour if left to simple analysis of office records by executives.

Planning for the future brings out in unmistakable manner the interdependence of every section of a business. Every executive, every manager, and every foreman or chief clerk must be taken into consideration when scheduling production. Responsibility for details must be fixed, and control must follow well-defined lines that will reach every section of the business.

The scheduling of a factory's output cannot follow a standard course in every case, but an outline of the general requirements of most businesses is shown in the diagram on page 206, which also shows the various estimates which must influence the final output schedule.

The schedule of output is naturally the first to be made up, and this is taken from the estimate of sales as prepared by the sales manager. Since the capacity of most factories is to some extent dependent on the financial department, a financial estimate should then be prepared which will enable expenditure to be controlled so as to keep within the limits of the capital available. This statement should not be a balance-sheet, but an estimate of actual cash available during certain periods, coupled with an estimate of the permanent expenses that must be met.

A great help to the estimating of expense is the analysis of general factory expense in two distinct sections—chargeable and payable expense. These cover expense for which actual cash has to be provided in the one case, and legitimate expenses of operation which, while charged against production, are adjusted through the books. In this latter category would be interest on capital investments, such as machinery, land, or building cost. In the former, the cost of unproductive labour, current repairs, light, power, &c.

Correlating the schedules

From previous records some estimate of the labour necessary to carry out a schedule, both from the point of view of quantity and cost, can easily be obtained. This and the material schedules will provide details which, coupled with the estimate of payable expense, will provide a basis for estimating operating cost. It is then a simple matter to check this against the financial estimate, and to adjust all the schedules to the best advantage. It is frequently a great advantage to have even an approximate idea of the likely cash margin at a certain period, owing to the necessity for adjusting purchases to fit market conditions on the one hand and factory requirements on the other. Once the purchasing department has an idea of the material likely to be required over a period, and the amounts available for investment in material, it can adjust buying arrangements to suit.

*Departmental
schedules*

Labour and material schedules are obviously prepared with the original output schedules as a basis. In addition, departmental production schedules may be required, especially when a factory is operating on standard products which enable production to be closely analysed and distributed. These departmental schedules will cover the portion of the scheduled output for which the departments concerned are responsible, and may be planned if necessary in conjunction with departmental labour and machine schedules.

It is often possible to analyse not only the amount of each class of labour normally necessary to manufacture a definite amount of product, but also to obtain an accurate record of the number of machine hours necessary for each class of machine. When such information is available, it is obviously a simple matter to schedule departmental production so as to show the maximum amount of labour that is necessary to fulfil an output schedule, as well as the maximum capacity of the machinery.

Such information will frequently enable a considerable amount of waste to be eliminated from departmental operation, as it not infrequently happens that certain departments are in reality overstaffed or oversupplied with machinery, either of which conditions will result in waste. An oversupply of labour can easily be adjusted, and very frequently a too liberal provision of costly machinery in one department can be adjusted either by transfer to a department where it is actually needed or

by providing additional work for it in the department where it is located.

* Scheduled production in one business located a serious leakage, caused by the non-operation of a certain class of costly machinery, which could only be operated for about 45 per cent. of its possible time. In this case an extra, but minor, product, was introduced to take up the spare time of the machines, and with such success that, within a year from its introduction, it had created such an increased business that two additional machines had to be laid down to meet the demand.

This is by no means an extreme case, as both labour and machine-time waste are common conditions in many factories. • Where only £1000 worth of machinery is in use, if figured at 10 per cent. depreciation and 5 per cent. interest, a nominal 20 per cent. waste of possible producing time means the addition of £30 to general expense that might be saved, even if a profit is not made in addition.

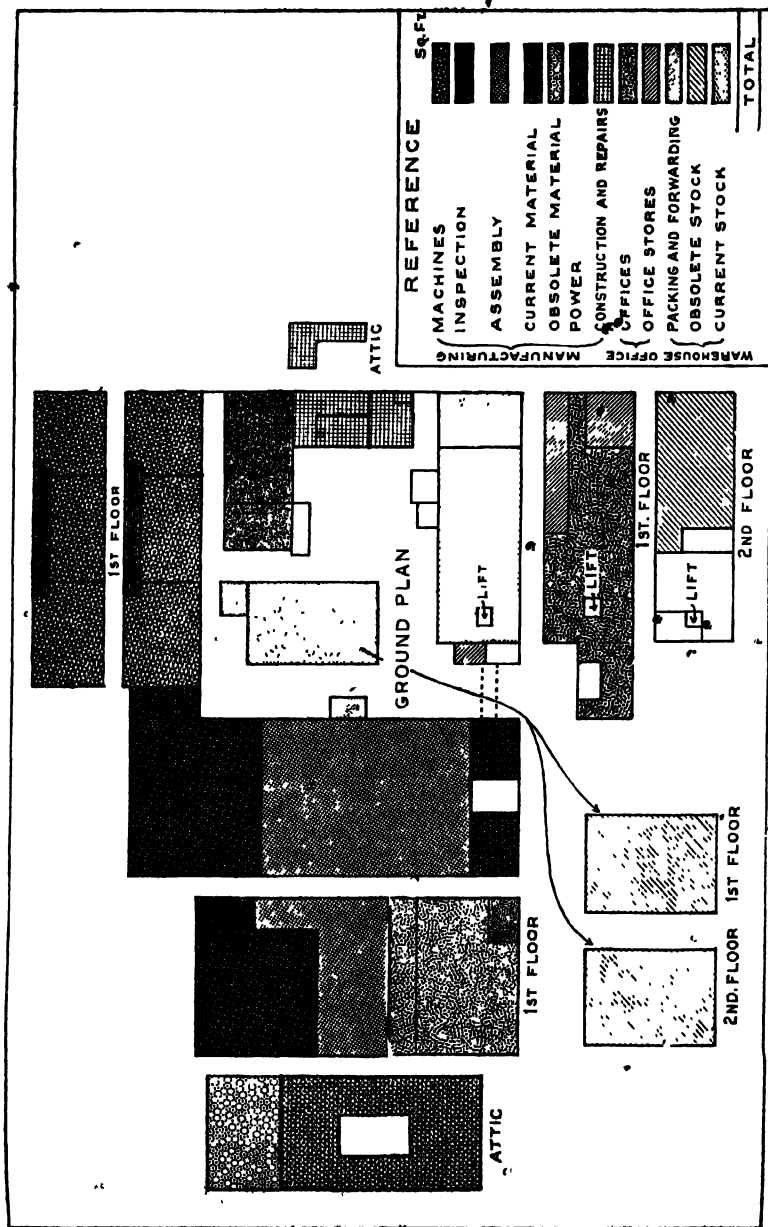
Labour and material schedules should be separated into two distinct sections, covering the originating and production departments of the factory. Frequently these two sections are scheduled without further analysis, and cover all the work and material of the various departments included in them.

Originating departments are those which are concerned solely with the preparation of material. In an engineering business, for instance, they would be the foundry and forge—departments concerned in production only to the extent of preparing material for the actual production departments.

Originating and production department

The stores is also an originating department, and its stock must be scheduled to cover both material purchased ready for production and raw material purchased for initial preparation by the factory originating departments. In the manufacture of a standard product, the stock of the finished stores, so far as it relates to finished parts ready for assembly, must also be scheduled ; and, where necessary, assembled sections should also be scheduled so as to provide a basis for final erection.

By scheduling the various stages for production in this way a basis is provided for proper consideration of future contracts and for making definite promises of delivery. Once material and departmental schedules have been agreed on, the preparation of assembly and erection schedules is a simple matter, as they are naturally merely



A FLOOR-PLANNING SCHEDULE IN USE IN A LONDON FACTORY

This is kept in stock in outline form, and a copy is coloured and floor areas filled in to show actual space in use at the end of each month. The schedules are then bound up concurrently for future reference.

a continuation of the departmental production schedules. In some businesses, where assembly of constituent parts is not a part of the work of the factory, stock schedules might easily be regarded as filling the place of final erection schedules, since in each case the idea is to obtain a basis for estimating with approximate accuracy the finished product that will be available at a definite period.

A vitally important record that should always be kept, whether production is scheduled or not, is a floor-planning schedule. Working space is expensive, and should always be utilised to the best advantage. This does not imply overcrowding or even over-concentration of machinery in the productive departments, but means that the space occupied should not be wasted in any way. *Floor-planning schedules*

Floor-planning schedules are simple to prepare, and simpler still to understand. The best type is one shown on the opposite page, which outlines the entire factory floor area on a single sheet, the spaces occupied by various sections of the business being filled in with different colours. Supplementary to this is a record in figures at the foot of the sheet showing the area occupied by each department, and as the sheets are filed concurrently the increase or decrease over a period can readily be seen. The sheets can be prepared weekly or monthly, according to the requirements of the business.

By this means a thorough knowledge is obtained of the actual space occupied by each department, whether productive or unproductive, and any demand for increased space from any department can be closely analysed and adjustments made.

With the assistance of a plan of this kind internal changes can often be made to better advantage than ever before, especially when departments or sections of departments which are closely connected have previously been separated by other sections. But the greatest advantage of such records comes from the knowledge they give of unproductive space; and when production increases to such an extent that enlargements of the productive departments are necessary, a thorough knowledge of the space in use throughout the factory will often enable the manager to redistribute the departments to better advantage, and meet the increased production without any further additions to the factory buildings.

Linked with the scheduled production, analysis of floor space is of great advantage in planning the work of the

Advantages of analysing floor space

various departments. The knowledge of production capacity it provides is also of inestimable value to factories where output is constantly increasing.

- It not infrequently happens that with a rapidly growing business a time arrives when demand cannot be met by output, owing to the fact that the extreme pressure is not realised until too late. With an advance knowledge of available space and production capacity, coupled with a record of demand that would show the increase that might be expected, a manager could gain time by planning his extensions ahead and then readjusting his internal arrangements to meet the increase until such time as the additional space was ready.

The scheduling of production details and influence will differ according to conditions, of course, and it is impossible to lay out any definite plan for the factory manager to follow. Every manager or manufacturer, however, can analyse his business from the point of view of the main principles of scheduled production, which cover estimating for the future on the basis of past results, and the linking up of every section of the business into a harmonious whole, which will achieve a maximum of efficiency at a minimum cost.

No one section can be scheduled without consideration for its relations with the other sections, and every section has in some way or other an influence on the rest. The basis of scheduled production must therefore be a properly designed internal organisation, without which no business can reach the highest point of efficiency.

CHAPTER XI

PRODUCTION

(3) CONTROL OF PRODUCTION DETAILS

Planning a Control System : Simplifying and Concentrating

Records : Clerical Control over Production : Progress Records :

- Keeping Promises of Delivery

SCHEDULED production provides the main control over output, but though it influences every detail of production, through the knowledge it imparts of operating results, it does not, in itself, provide the machinery of control over details.

An instructive analysis of the numerous elements of control over production details, so arranged as to be applicable to all classes of manufacturing, would be a difficult thing to prepare, owing to the fact that in handling the detail side of manufacturing every main section of the business is concerned and has to be taken into account.

This is not so much the case with the personal as with the clerical methods of control. Personal control over manufacturing details naturally follows closely the lines of the organisation, and is, consequently, fairly easy to follow. But to carry out clerical control over such clearly defined lines would entail a laborious multiplication of records that would entail both delay and expense.

In handling clerical details the close interconnection of each department with the rest must be taken full advantage of, and where one record will serve in place of two or three, the obviously wasteful method must give way to the time-saving one. At the same time, it must be remembered that the concentration of clerical details at any point must in no way interfere with the elements of direct control such details should provide over operating results.

An example of this principle might be taken from an assembly order issued to complete a machine. In this final operation a great many departments will be concerned.

The technical department will be directly interested in the details of construction ; the cost department in the final cost of erection ; the time department in the time expended ; the stores in the material used ; the progress department, in the progress of the work ; and the delivery and sales departments in the final preparations for delivery.

Most of these departments will have instructions to give, while all will be concerned in some clerical record that must be made. But instead of each department issuing its own instructions and each receiving a separate clerical record of the details in which it is concerned, the clerical details may be concentrated and a single order made to serve for the whole. This order, again, may accumulate much of the information required by the various departments, though being supplemented, perhaps, by one or two additional records that need to be in hand before the order is complete, and by certain records that have to be available daily.

*The concentration
of records*

This principle of eliminating unnecessary records by concentration can be carried out in the office departments as well, but it achieves its greatest saving in the productive departments, where the absence of clerical work helps to increase the production efficiency.

A fact that is often overlooked when endeavouring to concentrate records is that while time may be saved at one point, control may be weakened at another. The use of clerical records is based solely on control, and the weakening of control means the reduction of internal efficiency. Control must therefore be complete and efficient before any time-saving methods can be developed or introduced.

Manufacturers who start from an inefficient organisation to try and build up an efficient system of control over production are generally faced with the problem of increased cost as they proceed ; and the more details of production they endeavour to bring into the control system the greater the cost of clerical control becomes. As a consequence, they complain that organisation is expensive, creates too much detail, and is laborious and costly beyond the value of its supposed advantages. They experiment with it a little and give it up.

Such men fail to realise that an efficient organisation must be a complete working machine and not a number of individual systems or methods, each independent of the other. When a man creates a new machine he makes

it complete in the first place, correlates its various parts, and gets it working and producing the result he has been aiming at. Once that result has been achieved, he *then* begins to simplify it, eliminating the useless parts, making one part do the work of two or linking its sections up to better advantage.

It would be useless for him to try to improve each part individually without regarding its association with the rest, although he might, with expert assistance, manage to create in the first instance a highly efficient machine which had a minimum of weaknesses. Similarly, while he might experiment with a single section attached to an old and inefficient machine, it would be no test of its final efficiency, and the result might be more misleading than instructive.

Yet men who know these things fail to apply them to their own businesses. Just as a modern machine in its final stages of development may not only be more efficient but cost less to run than a machine of an antiquated type, so the machinery of efficient control in a modern business can be more efficient and cheaper to operate than the old methods of management. But this point must be reached in both cases by one of three methods—either the gradual building up of constituent parts after careful experiment, or by the creation of new machinery under expert assistance, or by building a machine to cover every detail and subsequently eliminating the unnecessary parts, the latter generally being necessary in any case.

Under any of these methods expense must be incurred. How great the expense is will depend on the method adopted, but whatever the method, the creation of an efficient internal organisation in a business is worth many times the investment in initial expense. Frequently the expense will be covered by the saving effected in a single week. Never can the interest on the investment be compared with ordinary investment returns, but often runs into thousands per cent.

Clerical control over production may be divided roughly into two distinct sections, each covered by a separate set of records, though at many points these records may combine to save time and labour. These two sections control the technical and financial details. The one is concerned in the details of production as such, while the other is concerned in the details of production as they affect the financial side of the business. Most of these latter will be

covered in a later chapter dealing with factory accounting, and the present chapter will deal more with the control of details which are normally outside the range of the accounting system.

One of the main points in this problem of production is that of location. It is impossible to control a part that is lost or strayed from its course, and if control is to be efficient, a basis for it must be laid down by assuring that everything in the course of manufacture shall be traceable and its position known. This entails the use of records that follow the movements of every detail of a product.

The process of tracing and speeding jobs in a manufacturing plant will differ considerably according to the internal organisation and the product manufactured, and no set lines to follow can be laid down for that reason. There are, however, certain main principles which will apply to most cases. The first of these is the centralisation of progress records and progress control. That is, the entire records affecting location of parts or product and the progress of work should be available at some definite point in the organisation, and should not be spread over the departments indiscriminately.

*Progress
depart-
ment*

The aim of these records is control, and control cannot be efficient unless it is centralised. Many factories centralise their control over details by means of a special department, generally called a 'progress' department, which takes charge of all records affecting the progress of production. Such a department is designed to keep an eye on all departmental or factory schedules, and immediately a delay shows itself, is able to speed up the individual parts that are left behind, and thus keep the various sections of the work up to time.

In smaller businesses the work of such a department may be handled by a single clerk, or as part of the work of a clerk, and is generally linked in some way with other record departments. This linking up is always necessary if the fullest advantage is to be taken of opportunities for saving time and labour on records, as records of progress are contained ordinarily in many other classes of records, and rarely need to be specially prepared.

As an instance of this, the time record may be mentioned. Workmen invariably have to enter on their time record the time spent on definite jobs, and in the majority of manufacturing businesses at the present day

such records are available daily. Obviously, if a workman records on his time card the fact that he has completed the drilling of a set of parts belonging to a certain order, he locates the parts and their progress. Then, if it is known that these parts are still due to pass through two more departments, and that the section to which they belong is scheduled for assembly immediately, the record points out not only the delay, but the point at which any 'hurry up' instructions must be directed.

It is not sufficient for these tracing records to be in existence, however. They must be assembled together and correlated if they are to achieve the purpose of controlling the course of production. Herein lies the necessity for a progress department of some kind or other, whether it is a special department staffed by a set of clerks or merely a set of records attended to as may be necessary by a clerk who is not otherwise engaged. *Tracing details of production*

It may happen, of course, that the product itself will not lend itself to progress analysis through the time or other records. This is especially the case when bulk products are handled or when a multitude of miscellaneous jobs pass through the same hands continuously.

In the latter case a simple method that is often used is to print the job orders with detachable slips which cover every operation. As the jobs pass through the departments these are detached and may first serve as labour records—whether the operations are by time or piecework—being used as tracing records for the progress department in addition.

It is generally possible to record progress easier by means of charts than by detailed records. Frequently the chart itself can be made to serve the same purpose as a clerical record if properly devised, while in some cases a chart ordinarily intended for another purpose may supply progress information. A chart illustrated in a later chapter of the present volume as an actual example of the charting of material, parts, and completed stock has frequently been used as the sole progress record. This chart shows scheduled requirements of each part of a series of machine sections, together with parts ordered as raw material or as finished parts, and parts in finished stores or ready for assembly.

It therefore covers in itself the main details of a progress record, but while a detailed progress record would take into account the various operations and departments through

which the parts must pass, the chart in question merely covers the raw material and the finished parts. In many businesses such a record used alone may be of service, particularly if the ordinary record system of the business provides the missing details in a readily accessible form, so that in case of necessity they could easily be referred to.

*Use of
progress
charts*

For general manufacturing purposes the stock chart is unsuitable, however, and special forms of tracing charts are frequently devised for recording details of progress. Several forms of these will be described later, but the main principles followed may be referred to here. Knowledge of the operations and departments through which work must pass is the main basis in each case. From this the work itself can be scheduled. That is, a limit can be set to the time the entire work should be finished and, if necessary, dates fixed as a maximum for each department.

Records of actual progress as provided by time cards or progress slips are then checked against the chart daily, completed operations being cancelled and delays marked prominently. The progress clerk is responsible for advising the departments which hold material that is behind time, and chart records on which such advices are shown help to call constant attention to the delay until the work is up to time again.

Very frequently, in manufacturing businesses, an entire order will be held up waiting for some simple part; or the work of an assembly department will be disorganised pending the manufacture of a set of individual parts, which, through lack of control, have been delayed. Scheduled production is designed to prevent such variations in production as this by demanding a sufficiency of parts for all current requirements, but unless some system of control over details is provided the schedule itself may fail to operate. The schedule merely supplies the basic demand for meeting estimated requirements, while progress control ensures the requirements being met.

*Keeping
promises
of delivery*

Promises of delivery are dependent on an efficient control system for their fulfilment. Many firms operate what they term a 'promise of delivery' system, which is literally a simple variation of the principle of detail control. In such systems the knowledge of a definite delivery date enables a time to be set for every detail of the work to be completed, and the system, by following the principles of control already described, ensures the various sections

of the work being in readiness for the next department or operation in sufficient time for the entire order to be finally completed within the promised time.

Occasionally the ordinary control system will be supplemented by a separate 'promise' system, so as to avoid interference with production details which have a more elastic time allowance on which to work. In such cases the 'promised' production orders can be distinguished by a special colour, or the order numbers can be coded to show the class of order. Progress on such orders is then recorded separately, for comparison with the specially scheduled times for the job.

This use of a separate record system for urgent orders will frequently help to speed up the work well ahead of schedule, as the order gets special attention, and in the case of a good time margin gained by the majority of the sections, the schedule can be advanced and the job hurried through well ahead of time.

If records of urgent orders were carried through with the rest of the factory work, such opportunities might easily be missed; and many firms who operate efficient progress systems for their ordinary work have found it a great advantage to supplement them with a special 'urgent order' system for that reason.

CHAPTER XII

PRODUCTION

(4) MAINTAINING QUALITY OF PRODUCT

Modern Methods of Quality Control : Competitive Influences :
Raw Material : A New Profession : Adjusting Control to the
Factory System : The Inspection Laboratory

ALL the main lines of control over production details are indicated by the demands of business conditions. Success in business depends mainly on three outstanding features. These are quality, price, and despatch. Control over the course of production, as already described in the previous chapter, will meet the requirements of despatch ; and an efficient factory accounting system will take care of the main details of cost, and thus help to meet the demands of price. The remaining feature that must be taken into account is that of quality, and any efficient system of production control must be planned so as to ensure at every point the maintenance of quality in the product.

methods of quality control during the past quarter of a century. Rule of thumb has given place to scientific methods of inspection and testing, and, instead of an unreliable personal inspection of product, we have the accuracy of the chemist's analysis or the unerring report of a finely graded machine that gives results of microscopic variations beyond the reach of any standard measurement tables.

Not many years ago a damaged machine meant the special manufacture of new parts, and careful fitting to assure accurate adjustment. To-day, standardisation has made it possible to heap together indiscriminately the thousands of parts comprised in a dozen delicately balanced automobiles of the same type, and to build a dozen perfect cars out of the mixture without selecting any particular part for any particular car.

Competition is forcing the development of quality control

in all businesses, just as it is forcing the development of scientific management. A firm of machine manufacturers demanding a steel to meet a definite scientific test in their laboratories and to maintain a definite chemical quality throughout, enforce modern methods of quality control on their suppliers.

At one time it would have been sufficient to take the necessary materials and produce a steel from a known formula. To-day it is no longer sufficient to work by formula. Certain materials, of a certain quality, made up in a certain way, should produce a certain class of steel. The buyer demands that the steel be of a definite tensile strength and chemical quality. The seller knows that his formula will give that strength and quality if faithfully followed, and if the materials used are as ordered. These two 'ifs' enforce quality control on the supplier. To be sure of supplying the right steel he must eliminate the 'ifs' by making sure that the formula is followed and that the materials are chemically accurate in constituency.

He, again, must order his raw material to a definite standard. His suppliers, to meet that standard, have to enforce quality control in their business, or run the risk of rejected material. In this way the links in control are forged by the demands of competition, until every business concerned in the final product, whether it is a bridge beam or merely a simple spring in a minor part of a machine, is brought into line.

The modern type of manufacturer does not wait for this natural pressure of competition to enforce a change in his methods. Instead of waiting for the demand for a product produced to a scientific standard he creates the product before his competitors, and gains, first a selling point, and, finally, a big lead in the struggle for business.

Business is always waiting for the manufacturer who can meet a demand; but the *best* business and the most profitable business, goes to the manufacturer who can anticipate a demand, or who can create a new or improved product that in itself will help to create its own demand.

Progress is the insistent demand of modern commercial conditions, and one of the main stimulants to business progress is quality—definable, scientifically accurate, and demonstrable. The price of quality is eternal vigilance, directed to the proving of every detail of material used, and the checking of every detail of production.

The maintenance of a standard quality necessitates the

adoption of one of the main principles of modern manufacturing organisation—standardisation. Only by thorough standardisation of material qualities, manufacturing processes, and tests of product can uniformity of quality be maintained.

*Control
over raw
material*

Quality control in any manufacturing business must necessarily begin with the raw material. Unless this is right the finished product cannot be right. Chemistry plays such an important part in the manufacture and preparation of raw materials nowadays that even in businesses where, under ordinary circumstances, a mechanical test would appear sufficient to apply to material, modern methods of manufacture and preparation compel the application of chemical tests in addition.

Thus come into being the factory chemist and the factory laboratory. These are the great safeguards to quality. Yet the work of the laboratory is not especially designed as a check over basic materials, but as a control over the technical side of production as a whole. Chemical analysis of raw materials is but one feature of its work. Preparation of formulæ for manufacturing purposes and the checking of product at various points in its course through the processing are others. One of its main features, however, is the control it is able to keep over standardisation in results.

In one of the biggest biscuit factories in the country the laboratory stands both as a guard over quality of output and a control over cost. Faced with a raw material that is subject to wide fluctuations in price, it maintains a normal cost by its knowledge of the chemical constituents of every class of material available. If one kind goes up to a prohibitive price, it readjusts its formula for blending so as to get the same accurate result from raw materials which remain at a normal price. In this way it not only controls quality, but the price of quality, and standardises both the character of the output and its cost.

Small businesses cannot maintain an expensive testing laboratory, of course, and in the race for trade might thus be placed at a disadvantage if technical assistance of the kind available to their wealthier competitors was not to be had.

*Creating
a new pro-
fession*

But just as the need for men experienced in the technical features of manufacturing organisation has brought into existence the professional organiser—a man whose wide knowledge of manufacturing organisation is at the service

of any manufacturer who desires to modify or improve his organisation without the waste of time and the disorganisation attendant on personal experimentation—so also has the need for expert advisers on factory chemistry brought into being the consulting chemist.

As professions, both of these are still in their infancy in this country, but in other countries the consulting factory chemist and the factory organiser or 'production engineer' have already established themselves. With the development of demand for advisory services of this kind the supply will undoubtedly rise to meet it, and even to-day no British manufacturer who is really in need of such assistance need be without it.

Many of the biggest manufacturers of raw materials, in addition to guaranteeing quality as such, are always prepared to supply the small manufacturer with laboratory tests of the material purchased from them, and when the firm is reliable and is maintaining a costly testing and analysis laboratory of its own it may be safer to trust to its guaranteed specifications than to make insufficient tests in a minor way.

This is not always the case, as many big manufacturing concerns which maintain their own laboratories have often proved. But to the small manufacturer, faced with the option between the added permanent expense of his own laboratory and reliance on the manufacturers' own statements of tests, the risk is worth taking, since it is, in any case, infinitely smaller than the risk that must be taken with raw materials bought on ordinary specifications.

Between the careful testing of the raw materials and the final proving of the finished product there remain an infinite variety of production details that must be controlled if quality is to be maintained at a standard level; but these details are so intermingled with other important details of production that no separate quality control system could be used without entailing waste of time and labour.

*Adapting
quality
control to
the factory
system*

Control over quality must, therefore, be planned as a part of the ordinary control system of the business—not as a secondary consideration, but as a primary necessity. It must, moreover, be automatic in action. No amount of personal control will cover all the details affecting quality in a product, and unless the control system is closely linked with the other systems of production control so as to automatically check every step in production, important variations may be missed.

Formerly it was a common condition in manufacturing businesses for a certain proportion of manufactured parts, or some portion of the product, to be discarded at the final test. This elimination of product that failed to reach a definite standard was right in principle; but it failed to take into consideration the most vital point in production control—the elimination of waste. A part upon which fifteen distinct operations have been performed, and that has finally to be discarded as scrap, is in itself a heavy enough loss; but if the error that causes the part to be discarded was committed at the seventh operation, there has obviously been a preventable waste of labour on the last eight operations.

Quality control, to be complete, must therefore take into consideration not merely the production of a perfect product, but also the elimination of imperfect product immediately the imperfections are created, so as to prevent further waste. This entails detailed inspection at every stage of production.

*Detailed
control
over
quality*

The character of the inspection devised to control the manufacture of a product will depend considerably on the product itself. In engineering and other businesses where a multitude of parts each necessitating separate manufacture go to make up a complete product, inspection has to be devised so that it will cover each operation. This principle must be followed, in fact, in every business that aims at perfection of control over quality, though the application of the principle may differ in each case.

In businesses where inspection is continuous and closely detailed, as in engineering, a special department is necessary to take care of it. Frequently such a department can be made to follow the course of production and thus save excessive handling cost. In one factory, where continuous production of small parts is carried on, the course of production is in a straight line from department to department down the building. The various sections are separated by the inspection departments, which link up at one end with a finished part store running the whole length of the departments.

In this case work automatically passes through the inspection departments on its progress through the factory, and, if complete, is handed over to the stores without passing into the departments again. Such a system is only possible where there is an enormous amount of inspection to be carried out. More generally the inspection department

is conveniently situated in some part of the factory, and small parts are transferred to it, as complete, by boys. The "bigger parts are attended to where they stand by employees of the inspection department, so as to save the time and cost of constant removal from place to place.

In the manufacture of many products inspection is *Inspection* purely a laboratory operation from start to finish, and only *laboratory* samples need to be taken after each process is complete. Whatever the conditions, however, the principles followed should be the same. Every step in production should be proved before the next step is taken. Every detail of production and every detail affecting the character of the product should be standardised. Last, and most important of all, inspection and every other detail of quality control must be automatic in action, eliminating imperfect product immediately it is created, and maintaining a fixed standard of quality through the perfect check that is automatically provided at every point in production.

CHAPTER XIII

FACTORY ACCOUNTING—AND COSTING

(1) COST OF PRODUCTION

Results of Cost Control : Production Cost : Prime Cost :
Selling Cost : Material Cost : Labour Cost : Cost Distinctions :
Capital Charges

HAVING dealt with the general principles underlying two of the three main requirements of industrial success—quality and despatch—the third requirement, that of price, must now be taken into consideration.

The price at which a product is sold is to an enormous extent controlled by competitive influences, and only when these competitive influences are reduced or eliminated by monopolistic conditions can the price be brought under the control of the manufacturer, even to a minor extent.

*Relations
between
profit and
cost*

The ultimate result at which all industry is directed is profit. Profit is the margin left to the manufacturer between the cost of his product and the price at which it is sold. Since competition fixes the selling price, any increase or decrease either in profit or cost must be adjusted between the two. Increased cost of product must necessarily imply decreased profit, and *vice versa*.

Control of cost details rests with the accounting section of the organisation. This section, in manufacturing, differs considerably from commercial accountancy, which is, to a great extent, laid out on fairly well-defined lines. Control of the financial aspect of manufacturing must take into account every influence at work in the business, and as these are both numerous and varied, and rarely operate the same in different businesses, factory accounting needs to be treated as a distinct subject instead of as an application of definite accountancy principles to industrial requirements.

There is, in fact, a very distinct dividing-line between the two accounting sections of business. Modern industrial organisation has created its own accounting principles, and these differ considerably from the general principles

which are still applied, and which were originally designed to meet the requirements of the earlier forms of business control. Analysis of details, instead of being left to visiting inspectors, is now necessary as a part of the permanent system of records. To-day the factory executive needs to know, not once a year, but every day in the week, what his business is doing.

Even one of our best-known accountants has been compelled to admit that 'systematic recording of costs is quite a modern innovation, and really scientific schemes are rare' (Mr. John Mann, jun., Vol. II., 'Encyclopædia of Accounting'), and has described lucidly the essential difference between ordinary accounting principles and modern methods of factory accounting as follows :

Cost records are an *analysis*, a separating of details and particulars of costs, while, on the other hand, an ordinary profit and loss account, or a trading account, is a *synthesis*, a grouping together of results.

In many cases the ordinary trading account is merely a locked storehouse of most valuable information, to which a cost system is the key. Many trading accounts, if not supplemented by cost accounts, are not very far removed from the crude method of ascertaining profit which consists of comparing statements of affairs at the beginning and end of a certain period. The difference is called a profit or loss, but it is merely the result of a heterogeneous mass of figures, and often a most unreliable result, so much so that in certain trades a profit and loss account without a cost system may sometimes be merely an unreconciled difference in the books. The balance of profit and loss written off is often the difference of much larger profits or losses on different items that appear on the surface, just as an apparently trifling difference in balancing a set of books may prove to be the result of errors of hundreds of pounds on each side.

Cost records trace the factors or elements of production to their sources, and if desired they show what each contract or sale has contributed to profits or losses—that is, they break up the product into its constituents.

Provided care is taken to avoid clerical confusion it is generally correct to say that the more minute the analysis the more valuable does it become.

To the professional accountant all costing systems seem strange at first, and the new ideas disconcerting, if not repellent, especially from their novelty.

It must be admitted that there are great difficulties in the way of really accurate cost-keeping, but these difficulties arise rather in devising a workable system than in carrying out a system once it is adapted to suit the circumstances.

The frequently expressed fear of increased clerical expense is largely imaginary. Good costing is not an expensive luxury. Any reasonable expense is found in practice to be fully compensated by many savings and economies and real gain in efficiency. Cases exist of a sound system being worked by fewer clerks than were required to handle a mass of worthless makeshifts.

The terminology of the subject is in its infancy and is at present rather confusing, but the absence of uniform nomenclature is not surprising in view of the novelty of the subject, and the prevailing secrecy regarding systems adopted.

How modern methods of financial control have changed may be gathered from the experience of a well-known firm, which, up to a few years ago, knew only once a year what its financial condition was, and which found, year after year, an untraceable waste in a valuable raw material which amounted to hundreds of pounds in value.

Results of cost control Last year this firm knew its waste week by week almost to a pound, and was able to control it so efficiently that the difference on the year's working amounted to only a few shillings. In this same business a test of internal efficiency occasionally applied to the working of its own accounting department is the preparation of a complete balance-sheet to date at an hour's notice.

Outside accountants are still called once a year to verify the accounts, but instead of waiting for their report, a complete knowledge of the financial details of the business is now available every day of the week, and the work of the accountants consists solely in verifying the accuracy of the figures which are continuously and automatically provided by the system in use.

Control, to be efficient, must be continuous, and unless the manufacturer adopts modern methods of controlling, not only production details, but cost details, he can never handle his business to the best advantage.

There are many elements included in the final cost of production that are neither definite nor directly chargeable; and these indefinite details are generally the ones which fail to receive proper attention either from manufacturers or accountants.

In order to bring these important details of cost forcibly before the manufacturer it will be necessary to closely analyse the whole problem of production cost, so as to separate it into its main elements. These can then be dealt with both collectively and individually so as to cover the entire subject.

Development of production cost The first element in production cost is that of labour. In the days before factories existed, or before land was entirely privately owned, material expense did not exist. Neither did any other expense but that of the labour necessary to find and manufacture raw materials into the necessities of life.

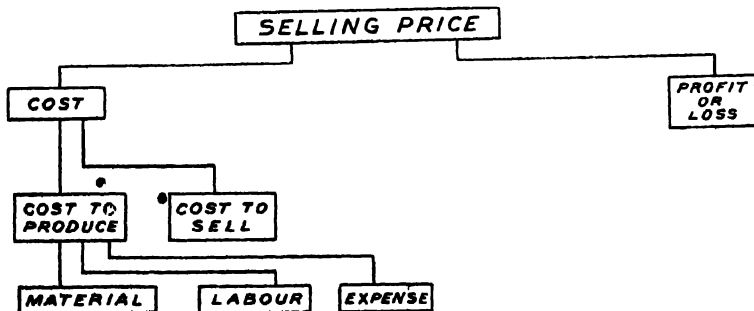
Such cost was then merely relative, and not until communal life brought into existence the individual craftsman did it begin to have an actual and definable value. When the craftsman had to devote his whole time to his crafts-

manship others had to devote their time to the discovery of material on which he could work, and to the value of his labour then came the added value of material, for which the finders had to be paid in value.

At this stage of manufacturing development material and labour were the only constituents of production cost. Here, however, comes into the field of influence the land-owner, bringing a new element into cost, viz. expense, created by the payment of rent for the space on which production is carried out and for the ground from which materials are taken.

Actually the only real elements entering into a product are those of labour and material, and the cost of these together is generally known as prime cost. Prime cost is the same to-day as it was when it first originated, but the remaining element of cost—expense—has grown with the development of business until it now includes innumerable details, each of which has come into existence through the natural development of manufacturing conditions. While each of these conditions is traceable to its source, just as are the elements of prime cost, no useful purpose would be served by dealing with their history in the present volume.

Product, when manufactured, must be disposed of. This *Selling cost* introduces the element of selling cost into the list, and, so far as cost is concerned, completes the main elements of which it consists. Profit being the aim of every business, the price at which a product is disposed of must leave a margin after cost has been provided for. This final selling value, or selling price, is therefore made up of the following main elements :

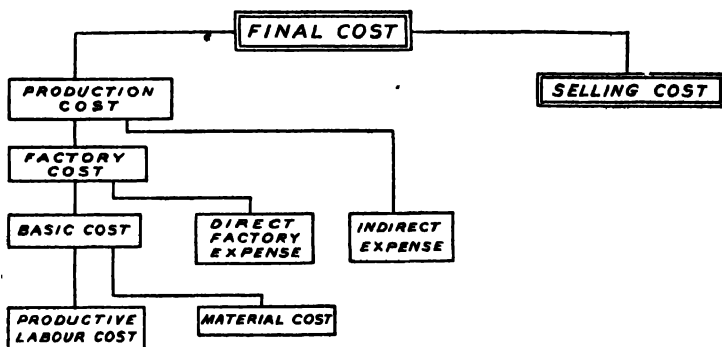


Theoretically, profit should always be a part of selling cost. Literally it is the balance left from selling cost after all cost has been met. If cost to produce exceeds the price at which product is sold, the difference is loss. Obviously, therefore, it is necessary to know exactly what cost is before any balance of profit or loss can be ascertained. This necessitates every detail of cost being taken into consideration, and only by close analysis of the constituent details of cost can this be done.

• Production cost

Production being the first consideration, it is necessary now to return to the question of cost to make. It should be mentioned here that a considerable difference of opinion exists regarding the exact meaning of 'prime cost.' The phrase has been referred to because it is generally used in referring to first cost of production; but, while one set of authorities imply by the term nothing more than the actual cost of the material used, and the direct labour necessary to turn it into a finished product, another set imply by the term a collective manufacturing cost which includes the expenses of direct production (such as machinery and factory administration) but omits all expenses not directly applied to production.

It will simplify matters, therefore, if the various sections of cost are referred to in the present volume under names which will not be in any way open to misunderstanding. The classification preferred by the writer in segregating costs is as follows:

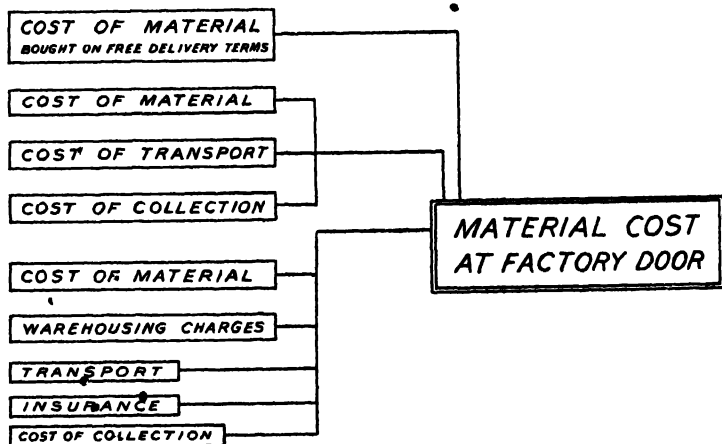


In this way first cost—that of material and the direct labour necessary to make it into finished product—is made the basic cost of production, and all expense, whether direct

or indirect, is added afterwards. This basic cost covers two out of the three main elements of the cost of production, and as these elements require constant supervision and control, any method which complicates their analysis by the addition of extraneous details is not likely to be of much assistance to the manufacturer who is unfamiliar with the numerous intricate phases of the costing problem.

No further analysis of the two sections of basic cost is necessary when they are treated in this way, except in occasional cases where certain portions of the cost of material are not directly included in the price charged for it. As an instance of this, material purchased 'free on rail' at a distant point may be referred to. Here material cost is incomplete, because basic material cost means the cost of material at the point where it is used.

To nominal material cost in such cases must therefore be added cost of transport and any direct handling cost that may occur outside the factory itself. This is vitally necessary if costs are to be equitably distributed, as material is purchased in many different ways, and a definite basis must be fixed for charging it in cost, or serious errors may result. The following distinct analyses of cost of material will show clearly that only one basis is possible if accuracy is to be maintained, that basis being cost at factory door:



It is unnecessary to treat direct labour cost in this way, because direct labour has no incidental expenses outside

the factory which need to be taken into account. Such details of direct expense on productive labour as may exist are common to all labour, and do not affect individual orders differently. Details such as insurance and the cost of an employment department, for instance, while they may justifiably be treated as a part of the cost of direct labour, are for the benefit of the whole, and their cost should therefore be distributed over the whole as part of the general expense.

*Factory
cost*

Having dealt with the basic cost of a product, we now come to the next step in costing—the analysis of factory cost. Factory cost, as covered by the diagram previously given, covers the actual cost of manufacture in the factory. There are many details of cost which enter into a product and which are covered in the total ‘production cost’ which are not, in reality, actual manufacturing cost. For this reason a distinction has been made between ‘factory cost,’ or direct expenditure which is incurred in the actual manufacture, and ‘production cost,’ which is factory cost plus extraneous expenditures which, while unnecessary to manufacture as such, are nevertheless necessary if manufacture is to be carried out economically.

This distinction between ‘factory cost’ and ‘production cost,’ however, is not, and never can be, made a definite principle of costing. This brings up the difficult problem of fixing divisions between the various sections of cost.

The division of cost into its main constituents cannot be standardised. The dividing-lines must always depend primarily on the business itself; and, in addition, on the controlling force of the cost department. So many details of cost are indefinite, and so many influences are constantly at work affecting it, that accuracy in costing depends to an enormous extent on the experience and ability of the individual who controls it. The greater his knowledge of the subject the more efficient he can make his system, and the greater the accuracy he can obtain through his ability to analyse and define the continuous variations that occur.

*Operating
a costing
system*

Many manufacturers have an idea that once a costing system is installed, any pound-a-week clerk can run it. This is a great mistake. No man who is unfamiliar with the basic principles of costing can operate a costing system efficiently, any more than a novice could operate the switchboard of an electric lighting station. The equipment may be there, but unless technical knowledge is applied to its operation it cannot be operated efficiently.

Costing pays for itself in the control it gives over every detail of production. A clerk put in charge of a factory cost system may manage to operate its mechanical features, but he cannot operate the features in which the human element plays the greatest part. His value, and the value of the system, will depend on his knowledge and ability, and, value against value, a manufacturer could better afford to pay ten pounds a week to a man who understood costs than one pound a week to a mechanical operator of a mechanical cost system.

An analysis of costing principles will be easier to understand if the two sections of expense are treated separately. This does not imply the creation of such a division when applying a cost system to factory conditions, as in numerous businesses practically every detail of indirect expense can be distributed over the product during manufacture without impairing the efficiency of the costing system as a whole. But in no case should a distribution of indirect expense be made, unless means of subsequent analysis are provided by the system.

So long as the clerical records will permit of expenses which are charged against product being recorded in detail, and subsequently checked and classified, it is rarely necessary to make two divisions of expense for charging purposes. The main point to consider is that the two divisions do actually exist, and that each is influenced by different conditions, so that if treated separately in the final analysis of cost and in the schedules of expense on which cost is based, they can be checked separately, and a better control be thus obtained over each. *Divisions of expense*

Profit, again, is not actual profit until it has paid all its standing charges. The main charge against profits is interest on capital. The demands of governments, municipalities, and secure institutions of different kinds create a constant demand for capital at definite rates of interest, and these rates, while low, are nevertheless always obtainable.

In this way a minimum rate of interest for 'safe' investments is created, and industry, owing to the elements of risk attached, must offer higher rates in order to attract capital. These higher rates vary with the security and the safety of the undertaking. But, whether high or low, they constitute a direct charge against the earnings of a business.

Profit, therefore, in the concrete means the actual cash balance after every charge against the product has been met, including interest on the capital employed. It matters *Capital charges*

little whether the capital is the property of the owner of the business or not. Its demands must be met, since, if a higher return for the investment is available elsewhere, the business is making a loss, no matter what its nominal profit margin may be.

The existence of such conditions obviously drives the manufacturer back on to the only point in his business at which he can increase profits, viz. the dividing-line between cost of production, plus capital charges, and selling price. Control over selling price being outside his influence, and capital charges being, in addition, more or less fixed and unalterable, he must reduce his production cost if he wishes to either increase his profits or maintain them at a normal level in spite of any gradual reductions in selling price that may be enforced by the demands of competition.

CHAPTER XIV

FACTORY ACCOUNTING AND COSTING

(2) THE PROBLEM OF EXPENSE

Selling Expense : Manufacturing Expense : Methods of Expense
 Distribution : Maintenance Expense : Property Expense :
 Direct and Indirect Factory Expense

TO reduce cost of production the manufacturer must know how it is made up, what it consists of, and where it offers opportunities for reduction. In the preceding chapter cost was classified into three distinct sections—labour, material, and expense. Theoretically the first two of these offer little difficulty in control, though in practice they present numerous delicate problems of cost control which are by no means easy of solution.

Compared with the problem of expense, however, they are comparatively easy. This problem of expense permeates every detail of cost, and covers the most difficult problems of material and labour cost. Once these have been dealt with the remaining details of labour and material cost will be comparatively easy to explain ; whereas to deal with these subjects first would entail a complicated explanation of their relations with expense that would in no way help to increase the lucidity of the discussion.

A close distinction must be made between the two main sections of industrial expense. These two sections are manufacturing and selling. Literally, the manufacturing section is independent of the selling section, in the sense that whether sales are made or not, manufacture can proceed. Again, it is possible that a factory will be devoted solely to manufacture, and the sales of product be carried out by a totally distinct organisation. *Two sections of expense*

This leads to the division of manufacturing and selling cost and expense, and as this volume is concerned solely with manufacturing, only expenses which affect manufacturing will be taken into account in detail. Practically speaking, the dividing-line between the two sections occurs

at the factory door. The order to manufacture creates the division, and it may be taken as a well-defined principle that all expense incurred prior to the issue of the manufacturing order, or that ensues after the goods have been finished ready for sale, is not concerned with manufacturing, but is entirely a legitimate selling expense.

Incidental details that are closely linked with selling expense may, of course, be chargeable to manufacturing. For instance, where an executive staff is concerned both in selling and manufacturing, its cost may be divided between the two in equitable proportions. Similarly, when the office staff is handling details of selling as well as manufacturing, a distribution of the expense incurred must be made.

This close division of the two main sections of expense greatly facilitates the designing of suitable methods of control. Generally speaking, even factories which have outside arrangements for disposing of product have some details of selling expense to meet, and the fact that these are small should not in any way prevent them from being taken into account. Only by close analysis can accuracy be assured, and unless every detail of expense is specially cared for, the results obtained cannot be satisfactory.

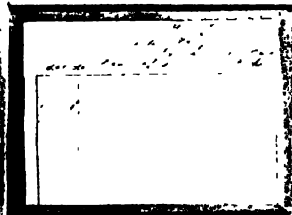
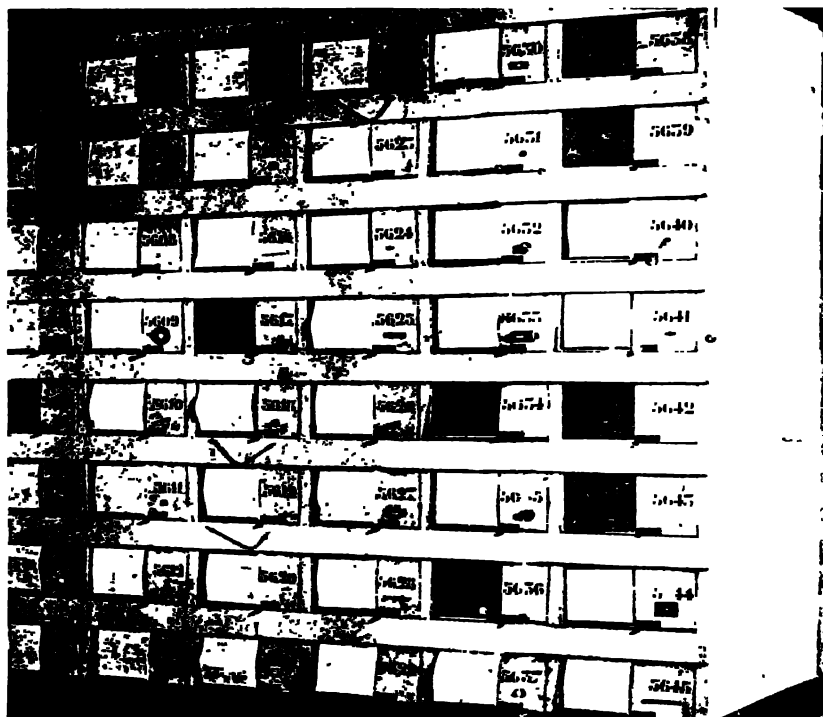
*Selling
expense*

Selling expense, or, as it is frequently termed, 'commercial expense,' is not a charge on product in course of manufacture. It is a charge on product *after* manufacture, and its distribution is therefore best carried out by charging to each order any special expense it has incurred apart from the business as a whole, and distributing the remainder of the expense over the business done *pro rata* to value. In this way a definite selling expense on each order can be obtained, and by careful analysis and comparison it is possible to locate any increase in selling expense, as well as to locate the cause.

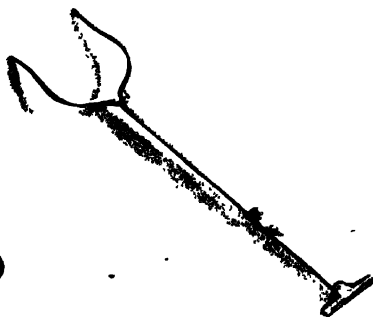
Manufacturing expense differs considerably from selling expense in that it is more generally chargeable direct on the cost of each order. This is the case, at least, with certain parts of manufacturing expense, although other sections of expense are common to the whole factory and must be distributed over the product equitably.

*Divisions
of manu-
facturing
expense*

These two divisions of manufacturing expense are known as 'direct' expense and 'indirect' expense. Excluding cost of material and productive labour, expense generally is also known by many different names, such as 'burden,' 'oncost,' 'establishment charges,' and 'overhead expense.'



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PARTS AFFIXED TO STOCK BINS

With stock card to show actual stock in hand. A useful method when small parts have to be stocked

Direct expense is that which is directly incurred by a product in course of manufacture. Manufacturers as well as accountants often fail to fix expense details in their proper classification owing to the fact that much of the indirect expense of manufacturing can, with proper analysis, be distributed over product as it is manufactured. It thus becomes chargeable as direct instead of indirect expense, and if an accurate classification is to be made it is obvious that some definite principle must be laid down on which expense can be analysed.

While there may be cases where conditions favour elasticity in the application of the principles of expense division, it may be taken as a safe rule to follow that anything which is in any way directly chargeable to product in course of manufacture should be so charged as direct expense. Unless this is done, many points of value to cost analysis will be missed, and the distribution effected will show results which may prove misleading.

An actual instance of this may be referred to here, and is of special interest as it led to serious conditions before the matter was properly adjusted. In this case, a wood-working factory was operating three distinct departments—a timber yard, a machine shop, and a carpentry department.

Each handled different classes of work, and orders were taken for each separately and for the three combined. The expense of the entire business was chiefly charged as 'indirect,' and was added to material and labour cost as a percentage. Yard business having fallen off to a minimum, while, in spite of careful charging, profits failed to appear in the annual balance-sheet, a careful analysis of the business was made.

In this analysis, every possible detail of expense that could be charged direct was taken into account. As a result, it was proved that, while under previous turnover a charge of 20 per cent. on direct cost covered all expense, under the changed conditions it required fully 30 per cent. to cover it. Of this 30 per cent. nearly half was incurred in a single department which entailed nearly five times the expense of another department. The charging of expense directly over the entire factory thus proved totally deceptive.

The yard was found to be bearing a proportion of the heavy burden of the machine and power departments, while actually it was totally independent of either. This saddling of one department's expense on another relieved

*Wrong
methods of
expense
distribu-
tion*

the normally heavy department of much of its burden, and costs figured for each thus unduly favoured one at the expense of the other.

Every batch of timber sold in the yard carried the firm's average of 20 per cent. expense, while, as a matter of fact, the actual ratio of expense was nearer 5 per cent. Similarly, the machine department, with an actual expense of nearly 60 per cent., was only bearing a third of that rate. As a consequence high prices ruled in the yard, which kept business away. Low charges for machine work brought business which, while it nominally showed a profit, was actually being carried on at a loss. Turnover maintained at a normal level showed gradually decreasing profits every year, which the accountants failed to trace to their source.

Finally, the firm's auditor engaged a cost expert to analyse the records, and from his detailed report a system was devised which covered every detail of expense and which ensured an actual profit on every order, whether carried out by one department or by the whole factory.

*How to
charge
expense*

Elasticity in the charging of indirect expense must therefore create a danger-point which only an expert could steer clear of. The manufacturer should avoid such intricate problems in costing, and, in order to do this, he must leave as little as possible to chance. By far the safest principle in dealing with expense is to regard every detail that can possibly be charged direct as direct expense, and only details that are so indefinite as to be impossible to distribute over individual jobs should be left to 'indirect' expense.

Direct manufacturing expense covers a multitude of details, which resolve themselves into distinct sections. The main sections of direct expense are set out in the following diagram :

DIRECT EXPENSE

MAINTENANCE	GENERAL
Rent, or Interest on Property Investment	Supervision and Control
Heating and Lighting	Unproductive Labour
Rates and Taxes	Material Expense and Waste
Insurance	Labour Expense
Hire, or Interest on Equipment Investment	Incidental Expense, such as the cost of indirect material used in processing, and which is not a constituent part of the product
Depreciation of Property or Equipment	
Repairs and other Expenses of Maintenance	
Power	

Each of these again can be split up into minor sections. Some of the main sections, such as interest on capital, are not further divisible into minor sections in themselves, but should be departmentalised, so as to distribute the total cost of the section over the main departments of the business. Expense which is a direct departmental expense must always be charged direct to departments, but expense which is common to the entire business may be distributed equitably over the various departments concerned.

Maintenance expense, for instance, will resolve itself into two distinct divisions—property and equipment. Equipment is nearly always departmental in character, with the exception of power and certain classes of handling equipment. Power being taken by each department in varying amounts, a basis must be fixed that distributes the power used by the factory equitably over the departments. It can then be redistributed over individual machines if necessary.

Equipment, other than that of power and general equipment not common to any individual department, must be distributed over the departments according to the interest they have in it. It would obviously be wrong to take the cost of handling equipment used solely by two or three departments and distribute it over perhaps a dozen. Care in planning distribution of expenses of this kind is therefore vitally necessary.

Property expense is generally the easiest to distribute. In this case we have a definite basis for distribution in the space occupied by each department, though this is not generally an equitable method if only a single distribution is made in this way. Site cost should first be distributed by charging all buildings with a site expense based on the actual proportion of site area they occupy, all space not occupied by buildings being valued separately, and distributed over the buildings according to relative site area. This, however, excludes land reserved for future developments as well as site areas used by distinct departments, such as the loading yard of the shipping department.

Capital invested in land for future developments is not a production expense, and the same might be said of capital invested in other ways and not applied directly to production. The basic idea of capital investment for the future is to save money. If a thousand pounds is invested in land, which is not to be used for five years, the cost of the land at the end of that period will be capital cost, plus interest on the investment and rates and taxes. The total may thus figure

about £1800. By that time it is possible that if it had to be purchased the land would cost nearer £2000, which thus shows a saving on the cost of the land. The cost of retaining the land, however, is no part of the working expenses of the business during the time it is held out of use, and only comes into production cost as part of the site cost of any buildings that may be erected on the site at a later date.

Having distributed site expense over the buildings, the building cost must then be analysed, and its total expenses, including site expense, distributed over the departments it contains. Incidental expenses, such as light and heat, may, if general to the entire buildings, be included in the total building expense and distributed over departments according to floor area. Any purely departmental expense must be charged directly to the department.

In this way a departmental building expense is obtained. The various sections of equipment expense must then be treated in a similar manner, all direct departmental expenses being charged to the departments and other expenses distributed over the departments according to the most equitable basis of distribution that can be found. This may be by floor area, or productive labour employed, or may even have to be carried out by some experienced employee according to his own knowledge of the conditions under which the expense is incurred. No definite standard of distribution can be fixed for factories generally. Each must adapt the principles of distribution to their own requirements.

*Direct and
indirect
factory
expense*

Of the main elements of direct factory expense, supervision and control are, perhaps, the most important. These cover the labour of foremen, managers, and executives directly engaged in production. If indirect expense is treated separately, a division must be made between direct and indirect supervision. Foremen, managers of departments, and working executives are all cogs in the wheel of production, and as such their labour must count as a direct expense. Certain of the office departments, again, such as the costing and time offices, and the general office departments which deal with the records of material and wages are also directly concerned in production details.

The cost of sleeping partners or nominal executives who take no direct interest in production is an indirect expense, and as such should be kept separate from the expense of direct supervision. Office departments which are not directly concerned in the manufacturing side of the business

would also be treated as indirect expense if their cost could not be directly charged to selling expense.

Once a factory has planned its expense and fixed the lines of expense control, schedules must be made up to which all expense details can be posted for analysis. The preparation and use of such schedules will be described in the second section of the present volume.

CHAPTER XV

FACTORY ACCOUNTING AND COSTING

(3) THE DISTRIBUTION OF EXPENSE

Planning an Expense System : Distribution by Production
Units : Distribution by Machines : Inefficient Distribution :
By-products : Indirect Labour : The Analysis of Distributed
Expense

THE charging of expense, whether direct or indirect, must be done departmentally. As the example given has proved, every section of a manufacturing business has its own internal conditions which affect the ratio of expense it entails. Close departmentalisation of the business must, therefore, be carried out for the purpose of charging expense equitably over the entire business. This departmentalisation need not necessarily follow the lines of the executive organisation, and, in fact, it is often found that the planning of departments for financial control entails an entirely different scheme from that which is used for departmentalisation for executive control.

*Planning
depart-
ments for
costing
purposes*

In planning departments for costing purposes it is advisable to treat them, as far as possible, according to the class of labour employed and the class of work done, subject to the conditions of the buildings permitting it. When properly planned, of course, such departments are self-contained and are not scattered indiscriminately about the plant, and as it is impossible to treat of conditions which are foreign to efficient organisation principles, owing to their infinite variety, any suggestions given will presume some definite plan of construction and departmentalisation having been already laid down on efficient lines.

After departmentalisation has been carried out, the departments themselves may need to be sectionised. This is generally the case with machine departments, owing to the differences in expense entailed by the use of different classes of machinery. A modern application of this principle has been the introduction in certain manufacturing plants

of a system of production units, these being either machines or sections of departments which carry a distinct expense ratio that is different from that of other units. By this means the distribution of expense over the product is simplified.

In a modified way this system is the one generally employed in all businesses where any serious attempt is made to distribute expense equitably, though generally the method adopted is to treat each individual machine as a separate production unit, and to make even a big department into a single unit so long as its expense ratio is approximately the same throughout. In certain businesses, however, this is impossible owing to the small amount of work done by each machine on a product, and in such cases machinery is generally departmentalised, and the expense distributed departmentally.

The principle of treating machines as individual production units for the purpose of charging expense is undoubtedly sound, as it closely allocates the expense of machinery and power, which, in most businesses, make up the greater portion of manufacturing expense. This method, in addition, enables departmental expense to be easily distributed in departments where only machine work is carried out.

The general details of the principle may not apply to all classes of business, but will certainly apply to the great majority. Machine cost is taken into consideration as a continuous interest charge against the machine. That is, interest on capital used in purchasing the machine, plus a fair allowance for depreciation, is taken as a foundation.

Power cost is then added, according to the actual power used by the department, which is distributed over the machines according to the amount of power they require.

Power cost, again, must be closely separated, and equitably distributed so that the year's total cost will be covered by the rates charged against the machines.

In addition to this there are other general and maintenance expenses, such as rent, light, heat, &c., which are purely departmental in character, and which are distributed as equitably as possible over the machines in use.

When this has been done we have a composite expense charge against each machine, which it must earn in the course of the year—or shorter period, if one is fixed—and which includes every detail of departmental expense in equitable proportions. Taking the approximate number of

Distributing expense by production units

Distributing expense by machines

hours the machine will be in operation, and dividing them into the machine's quota of expense, we get a per hour expense rate, which, charged against jobs handled, ensures every detail of expense being charged against product in proper proportions.

When similar machines are run in batches a rate can be fixed which will be the same for each. In dealing with other departments where labour only is employed, the principle can still be followed, either by dividing the department into separate production units, or by treating the entire department as a complete production unit. In such cases the expense is similarly totalled, and is distributed over the labour employed according to the total number of productive hours worked, this being obtained by totalling the nominal working hours of all the productive labour employed.

*How
expense is
distrib-
uted*

Productive hours, both of men and machines, are the basis on which expense is generally figured, as this presents not only the simplest but the most equitable distribution over the product handled. Cases may occur, however, —especially in businesses where a number of men or an entire department handles one machine—where machine expense as a separate item is eliminated, all departmental expenses, including machine charges, being included in the labour rate of expense.

Two forms of expense, which rarely receive the attention they deserve, are material and labour expense. Material expense, as distinct from material cost, consists chiefly of waste and handling cost, and it will depend considerably on the character of the business what method is adopted of distributing this over the product. Where only a few classes of raw material are used, each going to make up a single final product, waste can be averaged over the product very easily. It is when a great number of both raw materials and products are used that it presents the greatest difficulty.

As an instance of this, timber may be taken as a typical example. Mahogany, one of the most expensive kinds of timber, shows a considerably greater percentage of waste than pine, which is one of the cheapest. A pine board can generally be used from end to end; but it is a common condition for a mahogany board to have a foot or so at each end so split or damaged as to be unusable the full width of the board.

Taking 12½ ft. as an average length of board, and 8d. and 7½d. as the prices of common pine and mahogany

respectively, a simple material expense rate can be figured which will serve as a good example. Presuming that an article can be made out of 2 ft. of board, the pine board would produce six at a material cost of 6d. each, plus a waste of $\frac{1}{4}$ d. each. The mahogany board, on the other hand, would have $2\frac{1}{4}$ ft. of waste, leaving good board sufficient for five articles, at a material cost of 1s. 3d. each, plus a sixth part of the waste, which would be $2\frac{1}{4}$ ft., or 1s. 6 $\frac{1}{2}$ d., making a waste charge of 3 $\frac{1}{2}$ d. on each article. *An example of inefficient distribution*

The actual cost of a pine article would thus be 6 $\frac{1}{4}$ d., of which amount 4 per cent., or $\frac{1}{4}$ d., would represent waste. The mahogany article, however, would cost 1s. 6 $\frac{1}{2}$ d., of which 20 per cent., or 3 $\frac{1}{2}$ d., would be waste. Taking these as extreme cases, an average between the two would probably show fairly closely the average waste over the entire business. The average is nearly 2d., so that by averaging material expense in this case, an article actually costing 6 $\frac{1}{4}$ d. is made to cost 8d., or 28 per cent. more, while an article which really costs 1s. 6 $\frac{1}{2}$ d. is priced at 1s. 7d., or only 1·8 per cent. more.

This is a typical example of what the 'averaging' of expenses does to cost generally, and no matter what the product may be, its expenses should always be charged as closely as possible. Material waste is complicated by the fact that in many cases it can be treated as a by-product at a definite value. Spare ends of mahogany boards, for example, may have a nominal value to other businesses, probably of about 2d. per foot. This would reduce the actual material expense by about 27 per cent.

Such adjustments, however, are immaterial to the question of direct charging of material expense, and while one firm may be able to make them, another may find it more convenient to treat all waste as actual waste, regarding any by-products as a perquisite to swell the general profits of the business.

Where by-products of value are created in course of manufacture, of course, they must always be taken into account. Occasionally such by-products have a profit value as great or greater than the product itself. Soap, for instance, carries little material expense, and, on the other hand, creates a most valuable by-product in the form of glycerine. In such cases the value of the material waste must be used to reduce costs, otherwise they will be too high to allow a profit margin on production, which, in such cases, is not production of one, but of two distinct products, each of which must bear its proper share of the expense, *Taking account of by-production*

Practically the same problems arise in dealing with material handling cost as in dealing with waste, and similar care must be used to distribute its expense equitably over the product.

In addition to material expense there is the question of labour expense to be taken into account. Productive labour, which is directly chargeable against product in course of manufacture, is not difficult to deal with when figuring costs. Labour expense does not cover such directly chargeable labour, but indirect labour, which is generally termed non-productive.

A machine department, for instance, may employ a dozen men at the machines and, in addition, a labourer, a boy, and a foreman. The machine men, when they spend an hour on a job, have that hour's labour charged directly to the job. But the foreman and other non-productive employees, while devoting their time to the work that passes through the department, cannot charge it directly against each individual job. This creates an indirect labour expense which is quite as much a charge against production as the direct labour expense, and must be taken care of just as carefully.

Distributing cost of indirect labour

This is best done by including the cost of non-productive labour in the general departmental expense ratio, charged against productive labour. It is necessary to treat this indirect labour expense departmentally as far as possible, otherwise serious errors will be made. One department may require an amount of non-productive labour equal to the amount of productive labour employed, while another may have a minimum of such labour, and may handle a big staff of employees with no further cost for labour expense than that of a foreman.

There is often a limit past which indirect labour cannot be charged direct to departmental expense. Such indirect labour expense as that of the factory office staff and that of general supervision is not a departmental expense, but a general factory expense. This can, in some cases, be distributed departmentally in equitable proportions, and thus be charged in the ordinary departmental expense in the same way as the expense directly incurred by the departments. A more usual, and generally a more equitable method, however, is to treat all indirect expense separately, and to distribute it over product *pro rata* to the factory cost of each order.

Scheduled production helps considerably to adjust the most profitable ratios between labour and material expense

and production cost, as, by formulating a basis for comparison, it enables any excessive variations in such expenses to be discovered, and the causes traced to their source.

Distribution and verification of factory expense can be simplified by the separation of expense records into sections. A basis for carrying out this principle can be obtained by classifying expense into maintenance and general expense. Maintenance would then cover all building and equipment cost, which could be charged to a maintenance capital account, the cost of interest and depreciation being then distributed over the various sections of the business. Machinery, in the same way, could be purchased by the maintenance account, and hired out to the departments at cost of interest and depreciation.

Individual accounts, maintained for each machine or each department, would then have posted to them all direct charges against the machine or department, such as repairs, from a maintenance day book, in which every item of expenditure could be entered and analysed by means of special columns covering the various departments. Entries for machine repairs would show the machine number to enable the subsequent posting to be properly carried out.

In this way a proper analysis of expense as it occurred would be made, and at the end of a period could be checked against the expense charged against product during the period. Any discrepancy could then be adjusted in the expense schedule for the next period, and, in case of any serious difference, details would be available which would enable the cause to be traced.

General expense could be treated in the same way, but it must be remembered that in each case it is necessary to record expense in the same way as it is charged; and if it is sectionised in the records as it occurs, it must be sectionised in the charges against product, so as to provide means for checking one record against the other.

This would either necessitate two separate rates being prepared—one a per hour rate for maintenance, and the other a per hour rate for general expense—or means of separating expense after it was charged.

Cost of every detail of production being necessarily posted to the general office records, it is a simple matter to simultaneously analyse it into its various constituent parts. These, totalled for a period, will then show the actual charges that have been made against product for the period; and

the total can thus be readily checked against the corresponding section in the records of actual expenditure.

Properly analysed, production expense leaves little to be treated as 'indirect' expense. Departmental expenses, when charged against the departments, are distributed with the other expenses over product directly. What is left, after every directly chargeable expense is covered, is little more than the cost of the general factory office departments and the cost of executive control. These, again, can either be distributed proportionately over the departments, and thus become directly charged against production as it proceeds, or can be distributed over factory cost as already explained.

It is not suggested that such a system is accurate in every detail. But, for the matter of that, no costing systems are accurate. In fact, it is well known that no system of factory costing has ever yet been devised that could lay any claim to perfect accuracy; while a system that covered every possible detail in such a way that it could lay claim to even approximate accuracy would be so complicated and costly as to prove unworkable.

*Costing
not an
exact
science*

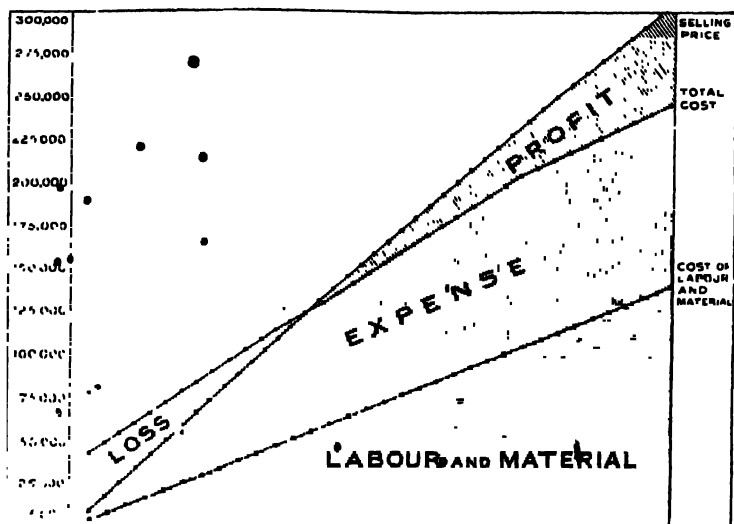
The reason for this is that details of manufacturing are so numerous, and conditions are of such a fluctuating character, that accuracy could only be obtained by the constant changing of the methods adopted to secure details. This is truer of expense and costing than of any other section of manufacturing organisation, and since conditions will not permit of perfect accuracy, simplified methods must be adopted to save expense, which can be so planned as to be readily verified and controlled.

Expense charged on the principle described is not continuously accurate. It must be remembered, however, that the limits placed on costing systems necessitate the acceptance of the principle that in some cases it is justifiable to average cost or expense when accurate charging is out of the question. This does not imply treating such averages as accurate, but merely treats them as the best alternative under the circumstances.

Factory expense, as has been explained in another chapter, bears an actual relation to production, in that it decreases as production increases, and *vice versa*. There is, therefore, a 'normal' point in production which will permit of fair profits being made, without forced output. That point is the basis on which expense charges are figured. Then, since

it is impossible to constantly change the expense ratio charged against production, it is obviously necessary to know whether it is being maintained at normal or not.

If it goes below normal a loss is being made. Selling price being a fixed quantity, this loss cannot be made up from an increased charge against the consumer. As it must, therefore, be coming out of profits, the duty of the



THIS DIAGRAM, WHICH IS BASED ON ACTUAL MANUFACTURING RECORDS, SHOWS THE DANGER-POINT IN PRODUCTION, WHERE EXPENSE WIPES OUT PROFIT ALTOGETHER AND RESULTS IN A LOSS

executives is clear—to stimulate production so as to maintain it at a profit-making point, viz. the point on which expense ratios are based.

An efficient cost system is, in itself, a continuous profit and loss account. It is better than the profit and loss account as generally known, because it takes into consideration *every* detail of expense, and classifies it as it is made. No annual profit and loss account can possibly do this. In fact, it might be truly said that no annual profit and loss account, if laboriously dug out of a year's records, can possibly be accurate, and is often misleading into the bargain.

The main principle of expense control is to analyse,

classify, and distribute every detail of expenditure as it occurs. All expense is a legitimate part of cost of production, and, as such, must be charged to production not as a whole, but to the sections that are immediately concerned. If treated otherwise, the whole system of costing is useless.

The basic principle of all costing is to charge *every* detail of expense direct to the point where it belongs if possible, but, in any case, in such a way that it can be equitably distributed over the product manufactured. A year's product, totalled at 'cost,' must then produce an amount that will cover the entire expense of production for the whole factory for that period.

CHAPTER XVI FACTORY ACCOUNTING AND COSTING

(4) ESTIMATING AND COST REDUCTION

Making an Estimate : Accuracy in Estimating : Modern
Methods of Estimating : Cost Reduction : The Indirect
Executive : Efficiency Insurance

WITH the aid of an efficient costing system, the manufacturer can devise means of making a profit by using the information it places at his command. If his products are sold in the open market, such profit will vary with the current value of the products as created by supply and demand. If he is able to fix a selling price himself, however, he is able to go further in his profit control, by ensuring that a definite profit is included in the price he fixes ; while, on the other hand, the prospective buyer, by obtaining preliminary estimates from manufacturers, can ensure a minimum expenditure for value.

Nominally, the making of an estimate of selling value is a simple problem in comparison. Actually, it is one of the most difficult problems the manufacturer has to face in his accounting. The basis of estimating principles may be laid down as the ability to ascertain approximately how much a certain article or a certain prospective job will cost, so that by adding a fair margin of profit, a selling price can be fixed beforehand that will ensure a profit being made. *Making an estimate*

Obviously the safest basis on which to figure a prospective cost is a knowledge of what the same thing has cost before. If this was all that was necessary, much of the estimating done to-day would be far nearer accuracy than it actually is ; but in figuring prospective costs it is not enough merely to know what the same thing has cost before. What must be known is what it *can be made to cost*. The essential weakness of most of the estimating done in this country is this lack of cost perspective in analysing past figures, not merely as records of results, but in conjunction with their relationships with current conditions.

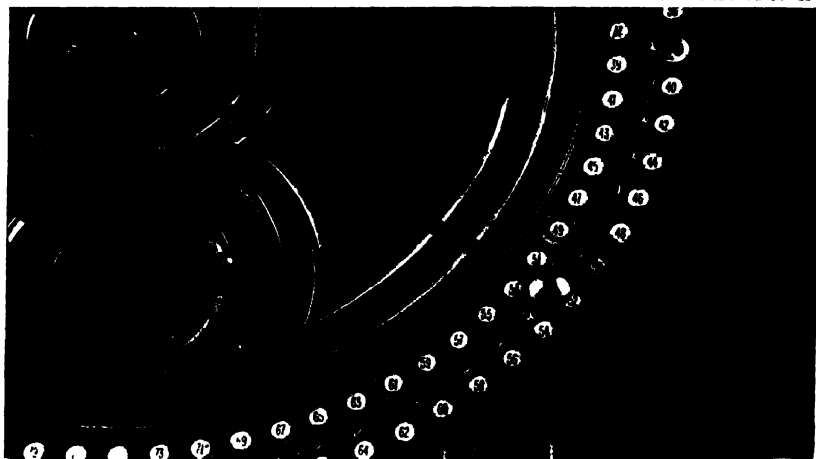
To ensure accuracy in estimating, the records of previous cost on which estimates are based must be known to be correct. In addition, they must be known to be prepared in the same way as the final records of cost will be prepared if the work is secured. It would be useless, for instance, for the firm whose experiences have been dealt with in a previous chapter to base a current estimate on the old methods of costing. Their old records, erring enormously, would be a totally inaccurate basis on which to work. Accuracy in the final estimate is entirely dependent on accuracy in the figures on which the estimate is based, and this necessarily implies accuracy in the costing system. If previous methods of cost have been wrong, by far the safest thing to do is to destroy or ignore them, so that they cannot affect the estimating of the future.

*Fictitious
value of
past
records*

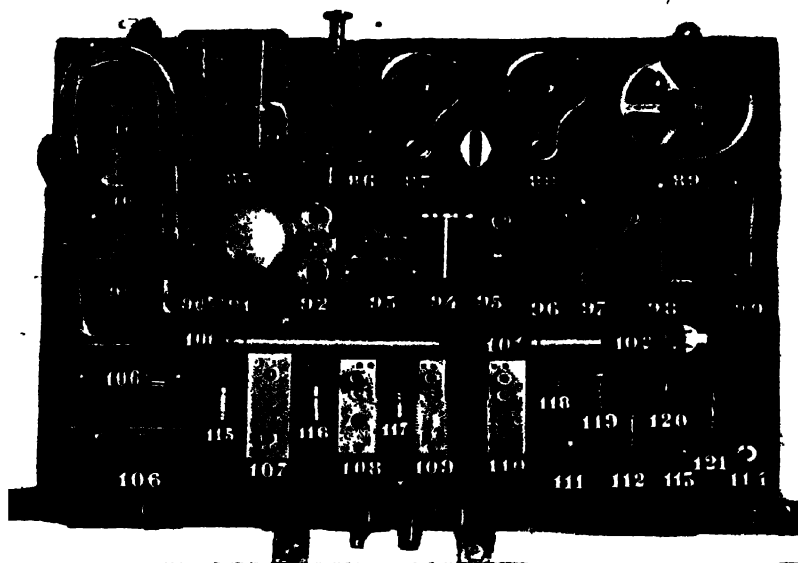
How erroneous past figures can be in estimating may be gathered from the experience of a few firms in one industry. These firms are manufacturers of what may be termed 'manufactured raw material.' That is, they take the original raw material and prepare it for the final manufacturers. In this industry, the values of manufactured raw material are fixed by schedules, agreed to by an association of manufacturers. These schedules, based on previous results, have been changed but little for many years, and are merely adjusted by percentages occasionally to meet the rise and fall of the price of the basic material.

The firms in question, after many futile efforts to have the ancient basic schedules done away with and new ones prepared from the actual costs of production at the present day, have settled down into the pleasant rut of producing only a limited number of varieties of material. By analysis of costs, they have found that the scheduled prices, under modern conditions, show a heavy loss on many lines, and a correspondingly heavy profit on others. For the sake of the final manufacturers, and in order to meet international competition, they tried to have newer schedules brought in, but failed. To-day they are making four and five times a normal profit, literally under compulsion, as they have long since ceased to prepare the classes of material on which there is a heavy loss, while on scheduled prices the remaining classes pay them a handsome profit.

Other firms in the same line of business still prepare the whole range of material, and complain of the bare profits or occasional losses they have to put up with, while actually their profits merely help to balance their losses,



A Belgian factory avoids waste of time through near-sighted employees fumbling for their numbers on the time recorder, by having a bright red ring painted round the numbers of those near-sighted workers



A part board showing actual parts used in a complete section, designed to avoid errors caused by the similarity of minor parts

TIME-SAVING DEVICES IN DIFFERENT DEPARTMENTS

and lack of detailed costing keeps them in the dark as to their real profit and loss.

Equally erroneous methods are common in many other trades. Builders who base estimates on antiquated volumes of theoretical figures, and other tradesmen whose sole knowledge of cost is based on labour and material cost plus a general percentage, all think they are 'estimating,' while, as a matter of fact, they are merely guessing.

Estimating is not guesswork. It is the carefully planned result of a detailed and comparative analysis of known facts. The basis of an accurate estimate is an accurate costing system. Once a manufacturer knows what every detail of a job actually costs he is in a position to figure what that same job can be made to cost again, and what competitive price he can quote that will leave him an assured margin of profit. The manufacturer who 'estimates' a job on the basis of 'what it ought to cost' may have technical knowledge behind his figures, but, nevertheless, is not estimating at all. The manufacturer who actually 'estimates' is the one who is able to figure a prospective job on what it *has* cost and on what he knows it can be *made* to cost.

Such knowledge need not necessarily be backed by a wide technical knowledge of the business. A junior clerk, assisted by a set of accurate records of previous cost, can prepare a more accurate estimate of future cost than the best trained foreman in the establishment if the latter is working without the assistance of such accurate records of previous results. The foreman only knows what the job *ought* to cost according to his knowledge of its technical details. The clerk has the advantage in that he knows what it *has* actually cost, and what it can, therefore, be made to cost again.

Add to the clerk's knowledge of previous cost the foreman's knowledge of present conditions and a combination is secured that can provide the necessary basis for a minimum but accurate estimate—a knowledge of what the job can be made to cost, not only on the basis of past results, but taking present conditions into account in addition. Thus, while both technical knowledge and accurate clerical records are each vitally necessary to accurate estimating, the more important of the two is the accurate basic knowledge of previous results.

The basis of modern estimating principles is the principles of the costing system. That is, every detail of direct or

Comparative estimates and costs

indirect cost on a job is analysed in the same way in preparing an estimate as it is in the records of cost. By this means a basis for closely detailed comparison is provided, which not only checks the accuracy of the estimate, but which helps to verify the efficiency of the methods that produce the final cost.

Detailed cost of every part and section of a product being automatically provided by an efficient costing system, it is a simple matter to post these so that a record is available of the cost of every part manufactured, or every minor job handled.

Posted in detail, these costs of similar jobs help to verify each other. Often it will be found that a certain workman can produce a part at a less cost than another; or that a reduction on previous cost has come through a reduced material expense, or some other detail of cost. What has been done once can be done again, and a knowledge of these minor details of cost reduction that have been achieved helps to provide the means for maintaining them, thus constantly reducing cost, first at one point and then at another.

From such records, again, estimates can easily be prepared. Being based on previous results, the records must be at least approximately accurate, and, if they are supplemented by a knowledge of available means of cost reduction that exist, they can be made more accurate still. Estimates prepared in this way can always be checked against the actual cost of the job when the final details are available. This is best done by posting the detailed cost to the estimate sheet itself, and comparing the estimated with the actual cost in detail. In this way details are brought to light which help considerably in tracing inefficiency at any point. Frequently the estimate sheet provides the only reliable means of comparing details. Where a product consists of certain definite parts, which can be accurately and individually costed, comparison may be more easily carried out on the records which list together the part cost of every set of parts manufactured. But where no definite or permanent product is manufactured, or where the bulk of the work done is different in some way or other, such records could not be kept separate. In such cases, records of sectional or total cost could be classified and cross-indexed in such a way that they would be quite as valuable for preparing the original estimates from as individual records of detailed part cost would be, the means

of comparing estimated and actual cost of details being best provided by the detailed estimate itself.

A practice followed by many modern concerns is to use an estimate sheet which lists every detail of a job, and which provides for analysis in the same way as the actual costs are analysed. Separate columns are provided for the cost details, and when the job is complete, the total estimated cost can be compared with the total actual cost, and the various details subsequently compared in the same way. Any serious differences between the two are thus traceable to their source through the comparative records provided. *Modern estimating method*

It is by no means an uncommon practice, and certainly one which has been found profitable in many businesses, to estimate practically every factory order before it is issued. This method is used chiefly in manufacturing businesses where bulk orders are handled, or where product is put through the plant in batches. This estimating is, in reality, the scheduling of cost before production, and the estimates are known as job cost schedules. Their value to a manufacturing plant is frequently very great, as they provide a basis from previous results on which a job can be carried through, and by their use every detail of the order can be watched and compared with the schedule as the work proceeds.

This method is also of great value to the financial department or executive, as it provides a knowledge of capital required to finance an order through the factory. Frequently a difficult financial situation can be saved through the knowledge given by production and cost schedules of the financial requirements of the factory at certain periods; as, by a readjustment of production, heavy expenditure may be avoided until the difficulty has been met.

Cost reduction, while nominally the result of efficiency in the costing system itself, is frequently more thorough when the cost system is linked with scheduled production and scheduled cost. Cost records themselves are merely bare facts relating to previous results. Rarely do they take into account any technical or other influences that affect costs, except in cases where it is found possible to link them with a system of efficiency payments to employees. As a consequence, while they will provide much of the vital information necessary to a close analysis of previous cost, they do not provide a full and complete record of what future cost can be made. *Cost reduction*

In the preparation of a job cost schedule, not only previous

results, but possible improvements, can be taken into consideration. Changes in equipment, improved handling methods, reduced departmental expense, lower cost of material—these and many other influences may affect future cost, and, where a complete organisation is maintained, can generally be taken into account when preparing a schedule. As a result, a schedule of this kind will anticipate cost reduction and help to enforce it, whereas the ordinary cost records of the business merely record it after it has occurred, and thus point the way to its maintenance in the future.

*Indirect
executive*

How far this anticipation of cost reduction can go in the preparation of job cost schedules will depend considerably on the men who are concerned in their preparation. Far too little attention is paid in this country to the value of men capable of carrying out cost reduction on a large scale. A common practice in many American businesses is to employ a special executive whose position might be termed 'manager of expense.' A common title for such a man is the 'trouble man,' and his usual professional title is that of 'production engineer.' He is an executive whose sole duty is to control the working details of the business machine. He carries no direct authority over the main sections of the business, though in many cases he controls the costing, and factory accounting departments. His main duty, however, is to control expense.

He is the cost reducer, the eliminator of friction, the investigator of efficiency problems, and a living encyclopædia of knowledge regarding internal influences and changes that affect the business. He is the chief engineer of the machinery of the business, and devotes his whole time to maintaining and improving its efficiency. Far from being an unnecessary or additional expense, he is often the most profitable expense in the whole establishment. One of these men has been known to hold an appointment in a business where every detail of expense is known, and its necessity proved, at a salary of £10,000 a year, and has held the position for several years.

It is difficult to make British business men understand the value of such indirect executives. A man of this kind, for instance, could take up a business such as has been described in an earlier chapter, and, instead of taking a year's hard study to create a change, would be able, owing to his wide knowledge, to make a basic revision within a week. The business in question finally increased its turnover on

a 15 per cent. decrease of labour cost, but, through lack of expert assistance, lost fully 11½ months during which the benefits of the change might have been gained.

Experience has proved that efficiency problems are not to be solved by an occasional executive investigation. *Continuity of efficiency problems* They are continuous—recurring every day and every week. No working executive has much time to spare outside his own section of the business that he can devote to detailed investigation of the business as a whole, any more than the captain or officers of a liner could find time to devote to the work of the chief engineer. A working executive's work is to direct the forces of production into the most efficient channels. The work of the indirect executive is to maintain the force itself at its greatest point of efficiency, coupled with the minimum of cost.

Such an indirect executive is generally the best possible man to employ for reviewing job cost schedules. His knowledge of every internal change made in the establishment, plus his ability to control points which tend to reduce cost of production, help him to schedule future cost with ease. Not only can he schedule cost, but he can also control it. Knowing the variations from previous cost that he has made, he is able to ensure the cost reduction he has planned being carried out.

Generally a position of this kind is filled by a general manager, who maintains direct control of expense and production. Where the business is small this method may prove satisfactory. But in big establishments no working executive can devote time to continual investigation. He is too busy with the section of executive control that is in his hands, and as a manager of production expense is often little better than useless. Only when the value of constant investigation of production details is understood, and when an executive staff can be planned to cover the main lines of executive control in such a manner as to leave some one experienced executive free to add the management of expense to his ordinary duties, can any real success be achieved with divided responsibility.

But in every business, whether large or small, and *Duties of a special executive* whether it can employ a special executive or whether the work has to be distributed, it should be the duty of some executive to control the working details of the production machine. This does not mean that he is to control the working of the machine, and to interfere with production control as vested in other executives. It simply means

that he is to control the lubrication of the machine, its adjustments and improvements, and its general working efficiency.

To some extent this is done by the executive meeting ; but what an executive meeting would need to discuss and investigate in order to get a proper perspective on its departmental influences, an indirect executive of this kind could decide in a few minutes.

Where a proper executive staff is in force, and regular meetings are held, the indirect executive would be the investigator of all suggested changes, and on his report the meeting would decide. Minor changes, and changes affecting records, could be left to his own judgment. Thus, he might have complete authority over cost records and factory accounting, as well as over the internal record systems of the factory, and be able to adjust or change them at will. He might also have authority to create a change in handling methods of a simple nature ; but any changes in methods or equipment, or any change entailing heavy financial expenditure or redistribution of departments, would be subject to the authority of the executive meeting. The work of the indirect executive in such a case is to investigate and suggest, leaving the combined executive authority to authorise the final changes.

*Efficiency
insurance*

Cost plays such an important part in manufacture that no factory can afford to neglect any possible means of reducing it. Justification for the high cost of an additional executive is found in the fact that he saves many more times the amount he costs. He represents, in fact, an efficiency insurance, and the premium, while high, is always justified. If manufacturers generally would regard cost and internal efficiency as their main profit-producer, and therefore quite as important as their factory or their boilers, they would realise that a small percentage of turnover devoted to their insurance is an investment quite as justifiable as the payment of other insurance premiums.

The plant which pays £10,000 to its extra executive is making a profitable investment, as the payment represents a justifiable premium on its efficiency insurance, and requires but a small percentage of its turnover to meet. One of the biggest factories in Glasgow adopts a somewhat different method of insuring its efficiency, by having its entire organisation overhauled occasionally by an imported expert. This latter method is perhaps the one most generally adopted when insurance of efficiency is carried

out in a business of normal size; and whether it is a small factory employing only a dozen hands, which pays only ten guineas a year for the insurance, or a large factory which can afford to run to twenty-five times that amount, the investment is always a profitable one.

Few manufacturers realise fully the innumerable details that can affect efficiency and sap profits. When they do a great change will come over British manufacturing methods, and efficiency insurance of some kind or other will become a recognised policy.

CHAPTER XVII, BUYING AND STOCK-KEEPING

The Organisation of a Buying Department : The Relation
of the Buying Department to the Factory : Buying Depart-
ment Records : Associated Interests : Stock-keeping :
Verification

AN important link in the organisation of any manufacturing plant is the buying department. Generally it is not treated as a separate department, but is handled in sections by what are regarded as the departments concerned, with or without some executive controlling the final issue of buying orders. This principle is erroneous.

*Influences
affecting
buying
methods*

Buying is closely affected by a great number of direct and indirect influences, arising from many different sections of the organisation. These influences frequently work at cross-purposes, and lack of proper co-ordination in dealing with them is liable to create a chaotic condition, which may reflect on other sections of the business. Bad buying methods are, in fact, as bad for a business as bad selling methods, or bad methods of internal control, and equally affect its efficiency.

The main work of a buying department is concerned with the purchase of raw material and equipment. Incidental purchases are also made, but are of minor importance when compared with these two main sections. These main purchases affect three distinct sections of the business. They affect the originating departments, which are concerned in the supply of raw material; the production departments, and the costing section, which are concerned in having an efficient equipment in order to maintain production at a minimum cost; and the financial department, which is concerned in operating the business on the lowest possible capital outlay, and in adjusting expenditures so as to gain minor additions to profits.

Without some definite method of control it would obviously be impossible to co-ordinate the demands of even these

three main sections, each of which must, to some extent, operate against the other. Occasionally, an efficient financial executive can manage to control buying as a whole without the assistance of a special department, but even when this is done it is still vitally necessary to concentrate records affecting buying so that analysis and control of details can be carried out apart from the general records of the business. Buying is always, departmentally, under the financial executive, when such an individual has a place in the organisation; but whether controlled by a special executive, or by one who has other duties to attend to, it is necessary to treat it as a separate and distinct department of the business.

The relation of the purchasing department to the rest of the factory should be that of an outlet valve, connecting every department, adjusting the demands of one to meet the objections of the other, and directing the expenditures of the business to the best advantage. Thus, while it must be to a great extent a subsidiary department to the main financial section of the business, it must also be able to adjust the pressure of control imposed by that section in its efforts to balance total expenditure, to meet the pressure of demand created by the producing departments of the factory.

*Relation of
buying to
production*

Great care must be taken when organising a buying department to impose as little pressure on its operation from outside as possible. Too great a control over it by the financial section will have a tendency to create a one-sided department that will regard every department solely from the point of view of finance, without any regard for the economic possibilities of production. On the other hand, a department too much open to pressure from the production departments, may become biased in that direction, and thus complicate the financial side of the business by unwarranted or disadvantageous expenditures.

The organisation of a buying department should begin by eliminating from the general organisation all matters directly concerned with buying. Frequently it will be found that such a preliminary elimination will enable the internal methods of the business to be rearranged so as to create a distinct line of action regarding purchases.

*Organis-
ing a
buying
department*

It is always necessary to departmentalise factory demands if the greatest efficiency is to be obtained from the buying department. Thus, material demands will originate at the originating departments, and through the heads of these

departments all matters relating to material requirements should pass for review. Equipment demands should, in the same way, be concentrated in the hands of the factory manager, and office supplies in the hands of the office manager.

These men are directly concerned in the operation of some section of the business. If, after subsequent analysis, the records of their departments show faulty management in the ordering of supplies, it is of no use to endeavour to place the blame if their authority in this respect has been usurped by a higher official. It is necessary, therefore, to centralise primary responsibility for the origination of buying orders in the hands of the departmental managers concerned, and any orders issued by these managers should pass direct to the buying department.

*Getting
advance
information*

When production has already been scheduled on certain classes of work, the buying department can easily be informed in advance of the prospective material demands, and can make all its arrangements to meet the known future requirements. Any factory demands issued, therefore, should always state distinctly the order the material is required for, so as to enable the buying department to separate the scheduled material from extra purchases. In the case of special materials, or the miscellaneous requirements of the factory, the department should be given definite information regarding the period the ordered material will cover and what regular requirements are.

Faulty buying comes from lack of knowledge, and it is necessary to concentrate every detail of important information at the buying department so as to enable it to carry out its work to the best advantage. The difference between four and six weeks' supply of a certain material may mean little to the foreman who originates the demand, but to the buyer it may mean the difference between a retail and a wholesale purchase, especially if he is informed of the actual factory requirements over a period.

On the other hand, a demand for a six months' supply may mislead the buyer into spending valuable capital on material which could be purchased at the same price in smaller lots as required. It is necessary to emphasise the importance of providing the buying department with the fullest information, as otherwise it is likely to be too much under the influence of the departments which originate the demands, and such a condition must seriously affect its efficiency.

The head of the buying department must be an experienced minor executive who is capable of dealing with the various problems that must inevitably occur in the handling of a firm's purchases. Personal ability in this respect counts for a great deal in the handling of a buying department. There is, however, a danger that personal ability may overreach itself and become too independent of mechanical aids. The practice of carrying things 'in the head' is perhaps more common in dealing with purchases than in any other section of a business, and there is great danger in permitting such methods to become a recognised policy.

Buying department head

Whatever the ability of the head of the buying department to remember important facts and to deal with difficult problems without mechanical assistance, such means of assistance must be provided and their use enforced. Buying records are of the greatest importance to a business, and should be carefully maintained, whether purchases are handled through a special department or not.

The records of a buying department resolve themselves into several distinct sections. Scheduled production provides a distinct set of records in the form of material and financial schedules, which, under ordinary circumstances, will be supplemented by further records of estimated future requirements. These records of future requirements enable the department to anticipate demands and to plan their operations to the best advantage.

Buying department records

Linked closely with the records which anticipate the future are the records of past prices. Records of previous purchases and past estimates of non-standard materials are necessary to efficient purchasing; but equally important are the records of the fluctuations of standard raw materials in the open market. These are best charted for future reference as they occur. Chart records of price fluctuations are of far greater value than figures, as they show at a glance not only the rise and fall in prices, but also any tendency to rise or fall the prices may have either at the moment or at definite periods of the year.

An important section of the buying records must be the records of sources of supply. It is at this point that clerical records are of the greatest value. Buyers generally are too apt to trust to memory when dealing with sources of supply, and the loss of the buyer in such cases means the loss of the records. Even when the responsible buyer is dealing with the matter, memory will often be at fault when ordering certain materials, and only by carefully recording

every available source of supply that is likely to prove of value, whether at the present or in the future, can the best possible use be made of such valuable information.

*Links in
buying de-
partment
organisa-
tion*

Linked closely on the one side with finance, the buying department is also linked closely on the other side with the stock-keeping department of the factory. Lack of efficiency in the keeping of stock records must eventually lead to serious errors in purchasing, and in the handling of stock records much the same policy needs to be followed as in dealing with buying records.

Wherever possible it is advisable to closely distinguish between the various classes of stock, and, although the entire stock-keeping system of the business may, in some cases, be under the control of one man, it is advisable to deal with the different sections of stock as distinct departments. There must be a close distinction, for instance, between raw material stock and finished part stock, the latter being again distinguished from finished stock ready for sale. Supplementary distinctions affecting other sections of the business can be made by treating office supply stock, factory equipment stock, and tool stock as distinct divisions of the stock-keeping system.

*Stock-
keeping
problem*

It will generally be found that the greatest part of the stock-keeping problem will be dependent on the cost-keeping methods adopted, and that the division of all stock affecting indirect expense must follow the lines of the expense analysis and distribution adopted for costing purposes. The keeping of material stock, again, will link closely with the method adopted of scheduling production, and in most businesses will be on the basis of stock required for the originating departments on the one hand, and for the actual manufacturing departments on the other.

The close division of stock into distinct sections helps to fix the responsibility for the maintenance of supply, and simplifies considerably the control of the demands which are made on the buying department. It is necessary after stock has been sectionalised to make some individual responsible for the management of each section. It may happen, of course, that one or more sections will be run as a single department, but even in such cases a distinction should be made between the various classes of stock, both in the storing and recording of the stock itself, and in its management.

*Stock
records*

Stock records should be as complete as possible, and means should always be provided for ascertaining at

BUYING AND STOCK-KEEPING

any time the actual stock on hand of any particular article.

This is usually carried out by means of a perpetual inventory system, by the use of which the actual stock in hand of any article can be seen at a glance. A common method is to attach inventory cards to the stock itself, or to the receptacles containing it, leaving the entry of stock in and out to the person who actually handles it.

This is a faulty method, as it rarely provides an accurate record. Stock clerks in a hurry are apt to leave the entry until 'next time,' and, as a consequence, the record is unreliable. In addition, it is no check against dishonesty, as an open record can always be falsified. It is better to make it a fixed rule that no stock is to be issued except on written authorisation. These authorisations can then be posted direct to a stock ledger, either in book or card form, in which the balance of stock in hand can be shown. It is then possible for the responsible book-keeper to check his ledger balances occasionally against the actual stock in hand, or to have a periodical inventory taken by his assistants, which he can check against the ledger records.

As the stock in hand must be sufficient to meet all demands it is advisable to anticipate requirements as far as possible. A useful help in this respect is the issue of material schedules when job orders are prepared for production, as these are then in the hands of the stock-keeper before the material is actually required, and a sufficient supply to meet the demand can be reserved in the ledger, or by fixing reservation notices on the stock itself.

Such intelligent anticipation of demand aids the stock departments considerably in their relations with the buying department. In the same way the buying department can help the stock-keepers by notifying them of stock ordered to meet special requirements. A record of stock due on certain dates is invaluable to the stock-keeper when planning the issue of stock on schedules, or when notifying foremen of special stock not in hand. The interdependence of one department on the other is, therefore, a predominating influence in the designing of a stock system, and care should be taken that information of value to other departments is properly distributed, or the efficiency of any system will be seriously impaired.

It is from the stock records that the buying department must obtain its vital information regarding material in constant use, and unless the records themselves are complete

they cannot provide such information. Records of material should contain information regarding safe working margins of stock of each line, showing the maximum and minimum stock allowable. Records of equipment material or supplies should contain, in addition, information regarding the amounts used over certain periods, and, when the necessary information can be obtained, of the minimum amounts that should be ordered at one time, or of the standard quantities the material is usually sold in.

*Verification
of
purchases*

Another section of the business that also links up with buying and stock-keeping is the verification section. This term is used because it covers the whole range of verification of material purchased. Generally, the verification of material outside the checking of quantities and weights by the storekeeper is done by the laboratory; but there may occur instances where some expert executive makes it his duty to act as examiner of material with which he is familiar.

Verification being a check on material before it enters stock, it is necessary to plan the system so that it can be expedited, and final instructions given regarding material delivered, at the earliest possible moment. A common weakness of many systems is the lack of an efficient check on material before it goes into stock, owing to an absence of co-operation between the various departments concerned. This weakness can only be avoided by taking inter-departmental associations into account when a system is planned, so that automatic checks are provided that prevent the material passing on its course until the necessary verification has been carried out.

It is impossible to plan an efficient system for any section of the business unless the sections which are closely related are taken into account. As a consequence, inefficiency at any point in an organisation must reflect its influence through the entire business in some way or other, and the adoption of efficiency principles in any factory must cover the entire undertaking and bring every section into line with the rest, or failure will inevitably result.

NOTE.—Many important principles closely affecting factory organisation and management are dealt with in other volumes of the present series, and can easily be referred to by means of the General Index in Volume X. For this reason, several points which are closely related to production have been omitted from the present volume, in order to avoid unnecessary duplication.

FACTORY SYSTEMS, CHARTS AND RECORDS

CHAPTER I

SYSTEMISING A FACTORY

The Elements of Executive and Personal Control : How
Clerical Control over Production is designed and operated :
Records of Progress which control every Detail of Production

THE foundation of an efficient factory system must be a skeleton framework of production control, based on the results of departmentalisation. By closely departmentalising a business it is possible to provide more accurate and efficient checks on production at every point than is possible when the entire business is treated as a single production unit. It is intended in this second section of 'Factory Organisation' to apply the main principles set out in the preceding section to the details of actual organisations ; and, while it would be impossible to show the application of such principles to the requirements of every business, certain specific organisations and methods will be described which will bring out as clearly as possible the main principles of industrial organisation in such a way that they will appeal to all classes of manufacturers. *Principles applied*

The basis of the present chapter is a composite arrangement of the organisations of several well-known businesses, which has been adapted so as to provide a series of suitable illustrations of modern methods of internal control and management. So far as the space will permit, the main outlines of a complete clerical control system are dealt with in the production chart on page 272 ; and in tracing the operation of production systems in later chapters various other important details of control will be described. A further chart has also been prepared, which shows the main lines of executive and personal control in an industrial organisation.

In planning a factory system, very definite lines of personal control must be laid down, which will fix the responsibility of every executive, or any other individual concerned in the control of any portion of the business, and which will also closely departmentalise the entire organisation. These lines of personal control must be entirely distinct from the lines of clerical control, and, while the latter may be affected by the method of departmentalisation adopted, they are influenced comparatively little by the ordinary personal control system as a whole. *Personal control*

The main elements of personal control must be primarily based on a sectionalisation of the chief divisions of the business, after which they must be further separated into distinct sections and departments, each in charge of a responsible head. The chart on page 274 shows the personal control of an extensive manufacturing business, and it is laid out so as to provide a definite basis for the distribution of responsibility in many businesses of different sizes. The main sections are split up into divisions for the purpose of showing how both sections and departments link up together in the personal control system while retaining each a separate individuality.

Any one of the section or departmental heads may, in a smaller organisation, have full charge of the whole of the divisions which are shown in the chart as being under his authority. For instance, a small business may operate with a single individual in charge of the entire work of the four individuals who, in the chart, make up the finance committee of control; or the production executive may be, in addition, either chemist or draughtsman as well as factory manager. Whether the business is small or large, however, some definite lines of control must be laid down; and the chart under discussion has been designed to assist the executives of all classes of manufacturing businesses in designing a suitable system.

Lack of such definite methods is a common cause of mismanagement in industrial enterprises, as it leaves the way open for disclaiming responsibility, which is constantly taken advantage of by men whose actual responsibility is not definitely fixed. *Fixing responsibility* Efficiency principles demand that responsibility for every detail should be definable, and that it should be centred on some known individual.

This fixing of responsibility demands a definite plan by which such responsibility is properly distributed, so that whether it is a difficult question of finance, or the scrapping

of a broken screw, some individual has authority over it; and that individual is linked by the plan in an unbroken chain of responsibility of which the chief link is the controlling head of the business.

In the chart, each distinct section has been linked together as a 'committee.' These committees represent the executive or minor executive control over the sections and over the individuals concerned in the operation of the various divisions of the business. In every business there are a great number of 'associated interests,' which, while responsibility for details may be fixed on individuals, affect these details considerably, and by definitely providing for the association of the various individuals who are directly concerned in handling the associated divisions a great deal of trouble is saved.

When these associated individuals are linked together in the form of a committee, management is simplified, and instead of constant reference from one to the other, which wastes time, it is possible for the individuals composing each committee to meet together when necessary and settle any points of interest to their section, so that one knows what the other is doing and a definite line of action is mutually agreed upon. The bigger the business, the greater the importance of closely defining associated interests and planning committees. Many of the biggest organisations in the country are operated solely through their committees of management, which range from the chief executive committee down to minor committees which deal solely with the interests and responsibilities of the employees.

A seemingly simple question of policy regarding a minor department may reflect its influence throughout the entire organisation. Without some definite plan of control, such a policy may be brought into operation on the authority of a single individual, and be objected to first at one point and then at another, until by gradual changes and adaptations it is eventually brought into line with the general policies and requirements of the business.

This entails an enormous amount of waste, both of time and labour; and by referring such matters in the first instance through the various committees, they can be adapted to meet actual factory requirements and conditions.

In tracing the course of clerical control over production under the system applied in the chart on page 272, it will

be necessary to commence with the original order, whether this comes from the customer direct or from the sales department.

In the usual course of things this order first reaches the general office, and comes under review by the executives. In engineering, as well as in other classes of business, the next step is the preparation of drawings and specifications; while in certain businesses the latter may be all that are necessary. In either case, the equivalent of the drawing office will be in existence in the form of a department or individual concerned in the analysis of the component parts of an order and the preparation of lists of raw or other material requirements.

The necessary material specifications are next passed on to the department concerned in the control of final production details. In the case in question, this is the finished stores, this being the department to which all finished parts must eventually come, and from which they must issue for final assembly. The necessity for ensuring a final concentration of finished parts in time for assembly makes a finished-parts department vitally necessary; and as this department must be responsible for the delivery of the parts to the finishing departments, it is necessary that orders for their production should issue from, and be entirely arranged for by, the department to which they must eventually find their way.

In this way responsibility for minor production orders devolves on the finished stores—or its equivalent in other kinds of organisations—as the main link in the chain of actual production. These production orders are based on the specifications supplied by the drawing office, or by the individual responsible for the detailed specification of component parts of the product; and it is the duty of the storekeeper to maintain a balance between stock in hand, or required under scheduled production, and the parts ordered to be manufactured or purchased.

The responsibility of the storekeeper for the issue of production orders is frequently limited, however, in small businesses, as he is, in such cases, a minor link in the organisation. Occasionally, the drawing office, or the factory manager's office, will actually originate the orders, leaving the stores to control their distribution and the handling of the finished parts. In such cases the specifications are issued to the stores for information to be filed in regarding the stock of the various parts which is on hand, in the

course of production, or required ; and from the information thus supplied the production orders are prepared.

From, or through, the finished stores, orders affecting production issue in all directions, and it will be necessary to trace them one by one in order to show the various checks on production they provide and the complete and automatic character of the control. *Checks on production*

The primary consideration in production is material, both raw material for production and finished parts of the product which are purchased complete. The latter, being part of the ordinary stock of the finished stores, can readily be checked and a balance maintained. Raw material, however, is not a part of the stock of the finished stores, but is maintained separately. To the raw material stores, therefore, the storekeeper issues demands for raw material to be reserved for the orders in hand. At the same time he issues orders to the originating departments (in this case the forge) for other raw material to be prepared for manufacturing ; and copies of these originating department orders are sent at the same time to the raw material stores, which serve as an authority to issue such material on demand.

The raw material stores are controlled by the head storekeeper, who reviews their stock and maintains it as far as possible in accordance with scheduled requirements. But so far as current demands are concerned, the raw material stores are a separate organisation, and are operated distinct from the finished stores. It therefore rests with the keeper of the raw material stores to keep his stock in order ; and, subject to the authority of the head storekeeper, he issues his own demands to the buying department for raw material, while the head storekeeper issues demands for purchased stock for the finished stores. *Raw material*

In this way demands centre at the buying department for finished parts for the finished stores, and for raw material for the raw material stores ; and when buying orders are issued, copies are sent to the stores concerned. These copies may, or may not, state the quantities ; and where conditions make it possible, quantities are not stated, but are left to the storekeeper to verify on delivery, the weights or quantities certified as received being checked against the order by the buying department. This method prevents collusion between employees and outsiders, as well as carelessness in checking, which is common when store clerks know the quantities expected.

On special orders, however, it is occasionally necessary to inform the stores what quantities are on order, and the date they are expected, especially when the order is for material which is required urgently. In such cases the storekeeper can definitely reserve the expected stock for the order it is required for, and by knowing the quantities and date of probable arrival can often give definite promises to foremen which will enable them to plan their production to meet actual conditions; while without such information at its disposal, a department may fill its machines, and thus block the progress of an urgent order by compelling it to wait until they can be released.

Parts

Raw material being thus provided for, the next point for consideration is the production of parts.* Where a product is composed of a number of constituent parts, each bearing a separate individuality, and being, in a sense, manufactured products in themselves, it is necessary to treat each part separately, and to issue production orders for each. To distinguish these orders from the order for the manufacture of the complete product, they are generally termed 'job orders,' or 'part orders.' These job orders are issued by the finished stores to the department at which all actual records of production centre—sometimes with copies, which are used for progress records, and which will be dealt with later.

When drawings are used, many businesses leave the foreman of the department first concerned in production to make his demand for raw material as it is given on the drawing of the part. For many reasons this method is faulty, and in the present instance the material demand on the stores is made a part of the actual production order, which is perforated so that the demand may be torn off and presented. This enables the storekeeper to keep a close control on material issued, and, in addition, enables him to definitely specify the material that is to be used on each order.

The job order

After recording the details of the job order, both for costing purposes and for the purposes of fixing rates for special wages allowance, the cost office passes the order on to the department concerned in the first operation on the raw material. Generally, time limits for final production are noted on these job orders, so that the foremen of each department know approximately how wide a margin they have for production. In special cases definite dates, and even times, are fixed for the job to be out of each department.

It rarely happens that a foreman needs to take out material for an order immediately. More often he has other orders ahead which have to be cleared first. If he waits until he is ready to manufacture, however, there is a danger that the stores may have been careless in getting his material ready, in which case his arrangements will be upset and production will be delayed. To prevent this, the foreman issues a preliminary notification to the raw material stores immediately he receives the job order. This notification merely states the job number, the material, and the quantity required, and it is the duty of the storekeeper to return this to the foreman, marked with some definite advice regarding the material, such as 'ready,' 'on order,' 'due January 25,' or 'not yet ready, make further application in three days.' From these advices the foreman can plan his work ahead, and thus help to maintain a uniform production in his department. When ready for the material, he sends the material demand portion of the job order to the stores, and receives the material in exchange.

Each department issues its own job time cards to the workmen, and these are made up for each operation. In the case under notice very few operations extend over one day, and it was found better to clear all cards daily, those representing completed operations going to the progress department, while the few that represent operations still in progress go direct to the time clerks.

Time records pass through the inspection department *Time* for verification. Thus, on completing a job, the workman *record.* sends the parts, together with the job order and his finished time card for the operation, to the inspection department. Here the work is examined, and if correct, the date is noted, and the job order is immediately reissued with the work to the next department concerned. In the case of spoiled parts, an immediate notification is sent to the storekeeper and to the foreman. The time card of the workman is certified by the examiner, who notes any damaged or faulty work on it, and it is then passed on to the progress department, which posts its records from the operation and the job number, afterwards passing the card on to the time clerks.

In the time department, the operation or job time cards meet the time records taken at the factory entrance, and the two are checked against each other to ensure that the time spent in the factory is properly distributed over the job time cards. The cards then become part of

the ordinary cost and wages system of the office. For convenience in assembling in the office, and in distributing charges, the cards of each department can be different colours, and in addition can be distinguished by code letters which show the class of job—such as ‘stock,’ ‘special,’ ‘urgent repair,’ &c. .

*Progress
depart-
ment*

The position of the progress department in an organisation will be dealt with in detail later. In the present case it controls the progress of every detail of work passing through the production departments. The finished stores issues the job orders in duplicate to the cost office, and from the duplicate copy the progress clerk makes up chart records showing the parts and operations and the dates they are due for completion. The time cards of completed operations are then checked against these records, and any part which is behind time is ‘hurried’ by sending a special hurry slip to the foreman of the department in which the part is at the time, for attaching to the job order. The presence of this special hurry slip on the order then speeds it through the remaining departments.

At any time the progress clerk can tell the actual position of any part of any order in course of production. The finished stores is, in consequence, dependent on the progress department for information regarding sections complete for assembly, and instead of maintaining separate records in the stores, the progress department is depended on to advise the finished stores immediately a section is ready for assembly. This in itself saves time, as the progress clerk knows some time in advance of the storekeeper what parts are actually complete, and what sections are complete so far as their parts which are in course of production are concerned, the balance being, of course, supplied from stock.

Inspection

When all operations on a part are complete, the inspection department transfers it to the finished stores, together with the completed job order, and in this way the cycle of actual production is completed. Orders are then issued for the assembly of the parts, and are controlled by the progress department in the same way. No actual erection order is issued (the erection department being the equivalent of the finishing departments in other businesses) as a copy of the original order to manufacture, issued by the drawing office, is supplied to the erection department with an advice regarding the date due for completion of the order.

This method relieves the stores of the responsibility

for speeding up work, as the details are cared for by the progress department on the one hand, while the erection or finishing departments, by knowing the orders in hand, can plan work a considerable period ahead in order to meet promises of delivery, and as soon as they are ready, can begin to make inquiries regarding the sections required. Similar methods are followed in the case of urgent or promised work in issuing orders to the assembly department, these being issued at the same time as the job orders for parts, so as to ensure pressure being applied from two distinct points—the progress department forcing the work ahead, and the assembly departments demanding its completion on time.

Time cards from the various departments not concerned with part production are sent to the cost office daily in the same way as the cards from the producing departments, and are also dealt with by the progress department in the same way as the other cards representing finished operations. The progress department is thus able to maintain a complete record of progress from the first issue of the production order to the completion of the work, and these records are invaluable for future use in scheduling production, and in figuring time limits on which to base promises of delivery on urgent work.

The system is given in detail on the chart so as to show the various checks on production created by its operation. In addition, it leaves records where they are most necessary, and concentrates information at specific points, where it is always available. The basis of any efficient factory system is perfect control over every detail of production, and the provision of complete, continuous, and available information regarding every detail affecting production. It is not sufficient to have the information complete. It must also be instantly available, and must be maintained up to date in every respect. The weakness of many factory systems is that to discover the position and condition of any single part in course of manufacture, the 'complete' records of half a dozen different departments may have to be searched. By centralising this valuable information, the information can be made not only available, but valuable, and the progress department or its equivalent is therefore made the medium for centralising valuable data and means of control, which are frequently disregarded altogether.

CHAPTER II.

THE DRAWING OFFICE

The Drawing Office as an Originating Department : Filing
Drawings : Drawing Stores : Specifications : Alterations :
Miscellaneous Jobs : Drawing Cost Records : Miscellaneous
Stock

THE drawing office has aptly been termed the pivot of production. Justification for this title is found in the fact that it is from the drawing office that all designs and specifications originate, and on these two, practically the whole production and record system of the factory are founded. Comparatively few businesses treat the drawing office as a vital link in the factory system, not always because of inability to recognise its importance in this respect, but because of a disinclination on the part of the head of the drawing office to systemise its working and its records.

*Results of
lack of
system*

Very serious results accrue from lack of system in the drawing office. One firm, checking its drawings after a long period of careless handling, found that a great number were missing, and while they were able after a time to fix the responsibility for the loss on an old employee and to recover some of the drawings through the courts, they were unable to overcome the disadvantages consequent on the results of years of experiment being laid open to their most active competitors.

Another result which is by no means uncommon when the drawing office is not controlled by an efficient system is the waste of time and material caused by the use of out-of-date drawings in the factory. A foreman, having had a drawing in his possession for a long period, and having made innumerable parts to its specification, may receive a production order for further parts on a new and improved drawing; but being used to the old drawing, he misses the new drawing number entered on the order, and production proceeds on the old drawing until the mistake is discovered.

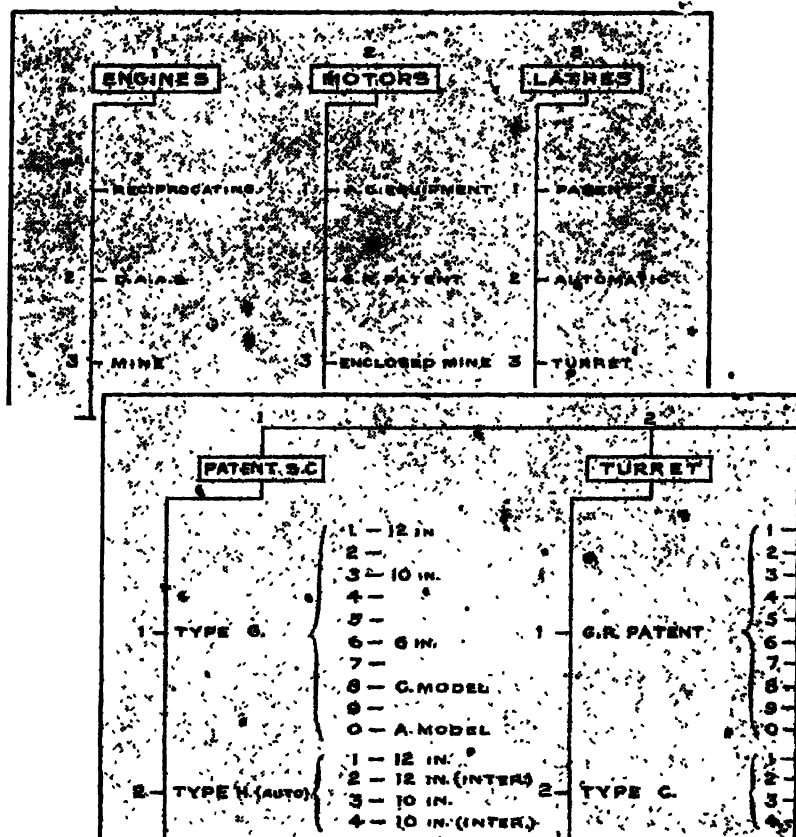
These are but typical results of lack of organisation in the drawing office. Numerous other instances could be quoted of quite as serious a character; and considering that the drawing office and its productions contain practically the whole of the vital and confidential technical information of the business, it is strange that more attention has not been paid to its management. Lack of organisation in the drawing office, however, is very often a direct result of lack of organisation in the rest of the factory, and when the entire business is linked up in a definite scheme of co-operative management, efficiency in the technical departments is automatically enforced to a great extent by the demands of the other sections.

The drawing office is literally the main originating *Pivot of production* department of the production section of the business. From it must originate the working drawings and specifications on which production is based. In most cases the working drawings and specifications of a business are to a great extent standard, owing to the fact that most businesses manufacture the same kind of product all the time. Variations occur in style, of course, and improvements may be constantly introduced, but the product itself remains practically the same. It would be a wasteful expenditure of time and labour to prepare special drawings and specifications for a machine of an old type, solely because an improved section had been introduced; but unless care is used in dealing with records of changes, serious mistakes are likely to occur.

Systematic control of the details of drawing office organisation must commence from the original drawings and specifications. These must be filed and classified in order to facilitate reference, and also to ensure accuracy in dealing with the various details they affect. An excellent system of filing, which can readily be adapted to the requirements of a drawing office, is one that has been based on composite numerals in such a way that it not only provides a means of filing the drawings, but also creates basic drawing numbers which are of great assistance in handling drawings throughout the factory.

An example of the working of the system is set out in the diagram on page 284, and it will be seen that the main classifications of product are given a single number, while each subsequent classification of each is also numbered in the same way, the principle being carried out to cover each individual class and size. Thus, lathes are numbered 3, turret lathes being numbered 2, and type C in

turret lathes 2. In this way a definite drawing number is created for the type, viz. 322, which, instead of being a



REFERENCE CARDS FOR THE DRAWING-NUMBERING SYSTEM DESCRIBED ON PAGE 283. THE UPPER FORM IS THE MAIN REFERENCE CARD, AND THE LOWER FORM ONE OF THE SUPPLEMENTARY REFERENCE CARDS

purely arbitrary number that is meaningless except to those who have the records to refer to, is a definite type number which identifies the drawing or the drawing number with the type.

The filing of drawings numbered by this system is simple.

A rack, ten sections high and ten wide, is built so as to hold ten cases or drawers in each section. These cases (or drawers) each contain two sets of folders, in which the drawings are filed, each section, case, and folder being plainly numbered. For standard drawings in use a folder of one colour is used, while for 'superseded' or cancelled drawings another colour is used. By this system of numbering the drawings themselves are classified into products, and in course of time the individuals concerned learn the reference numbers by heart, so that a drawing number will immediately indicate the part or machine it represents, and if necessity arises for examining all the previous drawings of a certain product, only a single drawer need be taken out instead of searching through all the past drawing numbers for all the drawings concerned. *Filing system for drawings*

Drawings should be made on sheets of standard sizes, and it is an advantage to print the margins of the sheets so that the necessary references are always in the same place on each drawing. Standard or special drawings should be stamped with their class when issued, and all drawings should be plainly stamped in some way. The same drawing can be retained for a part or machine until it is superseded, when the original stamp on the drawing can be cancelled and the drawing plainly stamped with the word 'superseded' and the date. It is then transferred to the 'superseded' folder for future reference. Each new drawing can be given a consecutive reference letter in addition to its drawing number to distinguish it from the rest if necessary.* Thus C 8231 would show that the original drawing had been twice superseded. In the case of changes in a machine for special purposes, the original machine being still made in the same form as before, the new machine is given a special supplementary drawing, and is treated as a new type with its own special number.

Obviously, when drawings are superseded, the specifications based on them are superseded also, as also are any blue-prints which have been made from them. This makes it vitally necessary that every single copy of a blue-print or specification should be under control, and recoverable, before new copies are put into circulation. Control over blue-prints is best achieved by the maintenance of a drawing stores, in which all prints are filed when not in use, and which maintains records of all prints taken out and returned. When this is done, a notification to the drawing stores to withdraw prints bearing a certain number from circulation *Super-needed drawings*

[illegible]

is all that is necessary to ensure their collection and delivery to the drawing office.

In operating a drawing stores, it is necessary to control *Drawing stores* closely all prints issued to the stores. This can be done by maintaining a blue-print order book, in which every print ordered is entered and signed for by the person ordering it, the printer taking a receipt on a card for each print

REPLACED.

DATE.	REASON FOR REPLACEMENT.	PASSED BY	REC'D BY		
PART No.		TITLE.			
DRG. No.		TYPE.			
DATE OF ISSUE.	CLASS OF PRINT.	NO.	MOUNT.	ISSUED TO	PASSED BY

FOR TRANSMISSION TO .

D 3
224

RECEIVED _____

BOTH SIDES OF A BLUE-PRINT RECORD CARD, WHICH IS SIGNED BY THE PERSON RECEIVING THE PRINT. THE CARD IS THEN FILED AS A PERMANENT RECORD

delivered. These card records of the prints made from each drawing are then filed by drawing numbers, and the number of prints in actual circulation can thus be ascertained at any time. Any prints not actually supplied to the stores can be recovered by the drawing office from the person to whom they were originally issued, and whose signature appears on the card. The drawing storekeeper is also responsible for all drawings for which he has personally signed.

Original specifications have to be prepared for every new type of machine designed, and it is important that these specifications should be readily accessible. By far

*Specifica-
tion
records*

the simplest method of recording them for future use is by the use of card records. These can be indexed and classified on the same system as the drawings, but as it is necessary to number each individual part separately, it is not often possible to carry the classification system far enough to include the minor parts or even minor sections. The simplest way to deal with part numbers is to number each part

PART No.		TITLE											
USED FOR THE FOLLOWING TYPES													
DRAWING No.		PAT. OR STAMPING DRG. No.			PATTERN No.			STAMPING No.					
REMARKS													

SPECIFICATION CARD USED FOR RECORDING DETAILS OF EVERY PART MANUFACTURED

separately, and to leave a margin for extra parts in each section. Thus, if a section contained 85 parts, numbers 1 to 50 might be reserved for it, and the next section, begin at 51, each part having its own distinct number. Specifications and full details of each of these parts, including its part number and title, drawing numbers, pattern numbers, and the numbers of drawings on which the part also appears, such as assembly and erection drawings, can then be entered on a card, which can be filed for reference.

The distinctive classifications provided by the numbering systems recommended make it unnecessary to cross-index the cards, or to duplicate the records so as to provide one set in numerical order and another classified by parts. This is done automatically by the numbering system, which thus saves time and labour.

In some cases it may be possible to make a single card record serve for all the necessary information regarding

Having provided for the proper control of drawings and specification details, it is now necessary to consider the issue of specifications to the factory. In some form or other, all businesses which manufacture products that are made up of a number of separately manufactured parts, make use of 'part lists' or specifications which detail the various parts composed in each complete product or machine. A useful method of preparing such part lists is to make them up on ordinary drawing-office tracing paper, with special columns for successive drawings, and to make blue-print copies from the original. Then, if a change is made in the specification, it is only necessary to draw a line down the column representing the previous drawing number on the original, and to fill in the new details in the next column under the next drawing number, the original thus becoming a new negative. *Preparation of specifications*

If the original drawing number is retained, the columns may represent 'batches' made under each successive order, and the drawing number at the head of the column would then give place to a batch number instead. The specification portion of the sheet should occupy only about half, the right-hand half being left blank (with ruled lines and columns) for the storekeeper to enter his stock in hand, or orders issued, and, later, orders completed. In some cases it will be better to paste supplementary sheets on the prints as a continuation for the storekeeper's special use. Lists of this kind can easily be made up in book form complete, and as the storekeeper's entries complete the record, they are not likely to cause trouble by being used for later orders, as may happen with printed specifications, or the ordinary type of duplicated forms. Careful record of any blank books issued must be kept, however, so that these can be immediately withdrawn from circulation when a change is made.

Part lists of this kind should always be made up with a separate index, which can be prepared in blue-print form in the same way as the part list sheets themselves. This index should classify the sections, and should give the part number, title, and drawing number of each part. On these complete lists the whole structure of production is built, as they are used for the issue of all manufacturing orders, and for the verification of all work done, copies being supplied to the inspection department for this purpose.

One of the worst difficulties that have to be faced in handling the detail work of a drawing office is the incidental

*Miscellaneous
work*

work which conforms to no standard, and which is outside the ordinary record system used for any standard parts manufactured. Special repairs, test work, experimental work, alterations, and structural alterations to plant, must all be taken care of and recorded in the same way as the details of standard jobs, and a special system is necessary

D. NAPIER & SON, ENGINEERS. ACTON VALE, LONDON, W.		INSTRUCTION SHEET N°	
This sheet is not valid without a printed number in above space.			
TITLE ..			
Date of issue ..	TYPE ..	PART No	Job No

HEADING OF A DUPLICATE ORDER FORM USED FOR ODD WORK. THE LOWER PORTION IS USED FOR A SKETCH OF THE WORK TO BE DONE

to take care of these variations from the normal course of straight manufacturing.

This difficulty can be overcome by the use of a separate duplicate card, index, and a special form of specification. The latter may be made a combined order, specification, and drawing, the order being at the top of the sheet, followed by the specification, and the drawing being made in the form of a sketch in the lower portion. These orders are given special consecutive numbers, and the details are recorded on two sets of cards, which are filed away for future reference, one set being indexed numerically, according to order numbers, and the other by the class of work. On the numerical card records, full details of any special drawings, instructions, or patterns issued are entered, the order number on the other card serving as a reference in case such details are required for further orders of the same class.

*Drawing
cost
records*

The drawing office is generally treated as a general expense on the business as a whole, and no check is kept on the work done or time taken on special jobs. When cost details are closely analysed, however, it is important that everything that can be made directly chargeable to a job should be recorded, and this includes the cost of making

Job No.	Customer's Order No.
Date	or instructions.

DESCRIPTION:-

REMARKS:-

Instruction Sheets.	Drawings	Patterns

Draughtsman:-

THE FRONT AND BACK OF A DRAWING OFFICE RECORD CARD OF
MISCELLANEOUS WORK

drawings quite as much as it includes the minor details of production expense. Drawing office labour needs to be recorded, therefore, in the same way as other kinds of labour, and this may be done by means of a weekly time sheet, verified by the chief draughtsman.

*Con-
trolling
progress
on
drawings*

The verification of time taken is not the only control over the work of drawing office employees that is necessary. Draughtsmen in any business generally range themselves in course of time into distinct classes, each expert in some particular class of work. As a consequence, it may be found impossible to distribute work equitably, or job by job, and a man may have half a dozen different jobs on hand at the

Name	Week Ending			
Day.	Detail	Description.	Hours.	O.T.
Mon.				
Tues.				
Wed.				
Thrs.				
Fri.				
Sat.				
DRAWING OFFICE DEPARTMENT.			TOTAL.	

DRAWING OFFICE TIME CARD USED FOR ANALYSING LABOUR COST

same time, some of which may have to pass through other hands before being completed. If draughtsmen are left to work as they please, delays are bound to occur, and it is therefore necessary to keep a close record of all work distributed in the drawing office, and to record progress on long jobs. This can be done by the use of a card record of all work issued which can be kept in a date file for reference.

By recording and classifying work in this way, a chief draughtsman can keep better control over the work in hand, and when anything appears to be getting delayed, can ask a man to report progress for his information. From his progress records he can then decide on work that requires hurrying, or that needs attention in advance of other work that may be in hand.

Where full responsibility for the manufacture and handling of stock is not vested in the storekeeper, much of it must naturally devolve on the drawing office, and will thus increase its ordinary responsibilities. Even when the

reverse is the case, many important details affecting manufactured parts must link with the drawing office system. One important detail of control which is often left to chance may be mentioned as a typical instance of incidental responsibility that should devolve on the drawing office. That is the handling of records of miscellaneous stock.

When parts are changed or eliminated, there is frequently a stock in hand which has to be dealt with. The same applies to damaged or spoiled parts of certain classes, and to parts of old machines which are discarded. In many cases, these may be left unnoticed in the stores, and may thus cumber the racks until a stock-taking period arrives, in addition to being a certain amount of dead capital that is earning no interest. On the other hand, they may be scrapped indiscriminately and treated as waste, with a value only equivalent to that of the metal they contain. In many cases such 'scrap' has a far greater value as it is. Parts superseded on one machine may be adaptable to another with little labour and expense compared with the cost of making new parts, and in this way a considerable quantity of dead stock may be utilised with profit.

The storekeeper cannot authorise the use of such stock, because he is not familiar with the technical side of manufacture; the factory manager cannot, because he does not usually know of its existence; and under ordinary circumstances the drawing office is in the same position. But it is the drawing office that can best utilise such stock, and by making it a rule that all seemingly valuable odd parts must be listed as miscellaneous stock and the drawing office notified, and that the issue of new specifications by the drawing office must also mean the issue of a list of all stock parts superseded, a basis for controlling such stock is provided.

The drawing office can then keep a special record of parts in miscellaneous stock, and when issuing specifications to the stores, can list any parts that can be used. When the job orders are issued by the drawing office, the using up of miscellaneous stock is simplified, as the orders can be prepared to cover anything that is usable without reference to the stores, which will merely have to issue the stock on demand for re-manufacture. Any really useless stock can be authorised to be 'scrapped,' and a periodical inspection of the miscellaneous stock records will keep the stores clear of anything of a useless nature.

Clerical control is quite as important in handling drawing office details as in handling the ordinary production details of a business, and unless the drawing office system is thoroughly efficient, it is likely to reflect an adverse influence throughout the whole course of production, even if it does not, in addition, cause serious delays or costly mistakes.

CHAPTER III

BUYING

Price Lists and Catalogues : Classifying Buying Records :
Buying Orders : Promises of Delivery : Checking Goods
Received : Ordering by Specification : Buying for the Future

EFFICIENCY in the buying department is so greatly interdependent on the efficiency of other sections of the organisation that the proper place for a buying chapter would naturally appear to be at the end of a volume, where the influences of other departments can be more thoroughly analysed and explained. But because buying must be the primary link in the material systems of a business, its main features are dealt with at this point, so as to preserve a continuity in the methods described.

The first consideration in designing a buying system is to provide means for recording the vital elements of permanent information. Sound buying is based on sound knowledge; and knowledge is best fostered by the aid of records of the past. The principal lines of permanent information that need primary consideration are:

Records of suppliers and sources of supply.

Records of past requirements, quotations asked for and received, purchases, and prices paid.

Records of prices of standard raw materials, with information regarding the causes of price variations over a period.

Records of chemical, mechanical, or other specifications of standard materials.

Records of estimated future requirements.

These form the foundation on which a sound buying system can be built, and will be dealt with individually. A complete record of sources of supply is of great importance, as it is on such a record that a firm must depend for lists of reliable firms from whom competitive quotations can be secured. Much of the information relating to standard products is naturally contained in catalogues and price lists, and the best method of dealing with these is to separate them

Requirements of sound buying

Catalogue and price list records

into two distinct classes. Catalogues in book form should be classified by sizes, and filed away on book shelves.

Each one should be plainly numbered on the back with a prominent reference number, and this reference should appear on any index to firms that may be kept, whether in book or card form. Flat price lists and small catalogues should be filed either in folders or boxes, and each given a reference number in the same way as the volumes.

Products listed in these price lists or catalogues should then be recorded on cards. In big businesses, it is often

Article			CAT. NOS.		
Date	Purchased from	Price &c	Date	Purchased from	Price &c

HEADING OF A SIMPLE REFERENCE CARD TO PRICES PAID

found advisable to use two distinct methods of indexing when listing products. The whole list is first indexed by guide cards, alphabetically. Articles of special name of which there is only one in a class are then easily located, though in some cases it may be necessary to again index some particular products. For instance, a firm may have on record for possible use as many as fifty or sixty different classes of oil, each having a distinct name, and in such cases a separate alphabetical index could be inserted to subdivide the cards relating to oil, the whole set being prefaced by a special guide card to show the material.

Classifying buying records A different method needs to be adopted in dealing with articles or material which have a great variety of different forms, yet which are known by the same general name. For instance, in the case of iron, a firm may use a dozen different varieties of the metal, and each of these may be purchased in from twenty to fifty different forms, sizes, or quantities. It is occasionally found better to separate such materials from the general alphabetical list, especially when the list is exceptionally large. But whether separated, or used as a part of a complete index, the best method of dealing with such materials is to provide separate guide cards for

each class, with supplementary guide cards to show sizes or quantities in each.

• On each of these record cards of material or articles purchased, names of suppliers, catalogue numbers and pages, and cross-references to other indexes are entered. The amount of cross-indexing necessary will depend considerably on the number of records maintained and on the character of the business.

As the order closely affects the records at this point it will be dealt with before proceeding further. Buying orders should, above all things, be specific. They should detail specifications closely, so that no supplier can avoid the issue in the event of dissatisfaction with the goods supplied. Generally, buying has to be done to a time limit, and occasions happen when delayed deliveries may stop production in some section of a factory. Time of delivery should therefore receive consideration in preparing the order. A useful method of doing this is to have the order printed with a detachable slip or corner, bearing the same number as the order, which it is the duty of the recipient to return filled in with a definite delivery date. Some firms supply an actual copy of the order for the same purpose, and in this way get a signed promise of delivery on the order itself. *Purchase order*

To get a promise of delivery is one thing, but to enforce it is another and a far more difficult one. When an order is issued, a special copy should be prepared so that space is available for the entry of subsequent information. If not prepared in such form, a record form should be used, on which particulars of the order, date, &c., can be entered, together with any definite promised delivery date or time. This should then be filed away in a date file.

If the orders issued are numerous, this record can be supplemented by a further record, filed alphabetically according to firm names, this second record being used as a means of locating the record in the date file. Each day the records in the date file for the day can be taken out, and the firms concerned can be communicated with, either by letter, telegram, telephone, or by means of a printed form of advice. This can be perforated so that the reply form can be detached, filled in, and returned. If a subsequent promise is received, the record is filed ahead to the date, and the date is entered on the alphabetical record. If a notification or reminder only is sent, the card is filed ahead to such a subsequent date as will allow a sufficient time *Promises of delivery*

for a reply to be received. Failing delivery by that date, either a further notification can be sent out, or the matter dealt with in other ways, according to conditions.

Records of this kind are far more valuable than mere entries on cards which show actual purchases only, and as they can be made on thin paper, it is possible to file them,

Order No.		Date	
Messrs.			
Goods			
Delivery Due			
Advised Delay		Promise	
"	"	"	"
"	"	"	"
Goods Rec'd		By	
Quantity			
Price		Price per	
Delivery Cost			
<i>Clerk</i>			

A RECORD OF GOODS ORDERED WHICH SHOWS ADVISES OF DELAY,
AND IS SUBSEQUENTLY USED AS A PRICE RECORD

indexed by materials, for future reference, in a comparatively small space. Very frequently a set of records of purchases of a certain material, filed in this form, will be of great service when ordering similar material in the future, as they will show not merely prices paid, but delays as well.

But as space is always a great consideration, it is simpler to reserve special columns in the purchase records for condensed entries which will cover the information the delivery records contain than to reserve a complete set of records, unless they can be made to serve another purpose. In a large business, it would be possible to post their vital information to the purchase record cards first, afterwards sending the records themselves to the cost office to serve as records of actual cost. In this way

they would serve a useful purpose, as it is not advisable to send copies of orders to the cost office, owing to the fact that they may subsequently be cancelled or modified ; while a record of this kind would note any such modifications, whether in quality or price, and the cost office would thus have a record of actual deliveries, and their cost.

The orders issued by the buying department should always provide a copy for use by the receiving department. This can easily be duplicated at the same time as the original, and by the use of cut carbon sheets can be arranged so as to omit quantities and prices, and also, if necessary, names of suppliers. Where the columns containing prices and quantities appear on the original copy, columns can appear in blank on the receiving department copy which will provide space for the entry of actual quantities and weights received and the dates. These can then be checked against the original copy of the order in the buying department. *Checking goods received*

Records of all past buying should be maintained for future information. In a small business, these may be incorporated on the same card as the record of sources of supply, by using both sides of the card. It is generally advisable, however, to make use of a special record for this purpose, and this record should list all quotations asked for and received, with firm names and dates ; orders placed, and prices paid ; and the number of notifications of delay sent on each order, with particulars of the actual delay in delivery. Such records are invaluable in maintaining the efficiency of a buying department.

While card records can be made to serve for the purpose of recording information of this kind, many businesses find it more convenient to use loose-leaf books of a convenient size. These can be indexed quite as easily as cards, and have the added advantage that they are readily portable and occupy a comparatively small space. With a book there is less chance of a record being misplaced, and, in addition, a book page can be designed of a size suitable for the records, while there is a limit to the size a convenient card record can be made.

Many standard raw materials, while they will come into the records of purchases in the same way as all other purchases, are not influenced to any great extent by competitive quotations. Promptness in delivery, or a lower transportation cost, may affect the choice of a supplier in the purchase of such material, and for that reason a record of purchases is essential. But so far as the price is concerned, this may *Records of purchases*

be fixed by national conditions, and be an 'open market' price, instead of an arbitrary price fixed by individual firms according to their own internal conditions.

It is essential that a good buyer should keep closely in touch with variations in such market prices, and should be able to analyse or obtain reasons for the variations in price that occur. In many cases, big firms of brokers or dealers in such materials issue chart records of price variations each year. Every buyer of this kind of material, however, should maintain such records himself, and in addition should supplement them with notes on causes which will prove of service in anticipating variations in the future. To know not only what to buy, but when to buy, is one of the main qualifications of a buyer; and by recording causes in price variations in the past, a buyer can often lay up information that will suggest 'when' to buy in the future.

*Ordering
by specification*

Accuracy in ordering goods is of great importance. With chemical, mechanical, and general quality standards constantly varying, it is necessary to specify material down to the smallest detail if trouble is to be avoided. Years ago it was customary for a manufacturer to order a ton of coal 'as before,' and to be content with what duly arrived, so long as it was coal. Nowadays, chemistry plays such an important part in manufacture that firms specify not only the quantity and visible quality of any material or fuel they require, but their actual chemical constituents or their mechanical efficiency. Instead of buying a ton of coal to-day, manufacturers are buying a certain number of heat units, plus a definable waste. And while the order is still for a ton of coal, it goes further and specifies just what the ton of coal shall be, and what it shall consist of.

With material subject to such minute specifications, it is necessary for the buying department to keep careful record of any detailed instructions regarding material that may be issued at any time, as well as any permissible variations from standard that may be authorised for certain special cases. A firm which has an extensive buying department covering thousands of different lines ensures accuracy in its specifications and in its acceptance of inspections of deliveries by making use of a special card record of a distinct colour, which is kept filed with the card record of purchases. Thus, when material is required, and the record is looked up for particulars of prices, or the names of firms to whom applications for estimates are to

be issued, the special instruction card shows itself, and is duly taken note of.

Occasionally it may be found possible to maintain a separate index of information of this kind, and so long as it is always referred to when an order or a request for an estimate is issued, this method is perfectly safe. A greater measure of safety is secured, however, by maintaining the record either with or *on* the record of purchases; and if a separate record should be kept, the main record should always be plainly stamped or marked to show that special instructions are on record.

It is of great importance that the buying department should be fully informed of any estimated future requirements, as this is of considerable assistance in planning future purchases. For every new specification issued, a special material analysis should be prepared for the use of the buying department, which will show the materials used and the quantities. These can then be filed for reference by the department, and when production is scheduled ahead, they can be referred to, and the total estimated requirements of every class of material can thus be obtained. Such information is of great value to the buying department when making purchases of raw material which fluctuates in price, as well as in adjusting purchases so as to avoid, as far as possible, any strain on the financial side of the business.

*Buying
for future
require-
ments.*

As a rule, the buying department does not concern itself with the actual payments for goods purchased, and for this reason does not include any important accounting records in its systems. After the verification of the delivery, orders can be laid aside to await the invoice, but in the case of returns or claims, or any debit or credit outside the actual amounts of the order, it is necessary for the buying department to handle the matter. For this reason it must keep a record of every detail of each order, and this can be done by the use of a complete analysis book, in which the orders are entered as issued, all details affecting the order up to the time the final invoice is passed for the accounting department being posted to the various columns as they occur. A complete financial record of the buying department made up in this form is of far more service than a set of cumbersome books, and is far easier to plan so as to fit the requirements of the general accounting system.

*Complete
buying
depart-
ment
analysis*

In an extensive business it may have slight disadvantages owing to the fact that all the records are together, and

may thus be difficult to handle when more than one department or clerk is concerned in the handling of them, and in such cases it is advisable to keep the records entirely in loose-leaf books and to distribute them over several distinct volumes if necessary.

These links with the ordinary systems of the business will differ according to circumstances, and no hard-and-fast lines can be laid down for handling them. Some useful suggestions, however, may be obtained from the records in actual use which are used to illustrate the present chapter.

CHAPTER IV STOCK RECORDS

The Classifications of Factory Stock : Raw Material Stock :
Finished Material Stock : Equipment Stock : Tool Stock :
Drawing Stores Stock

STOCK is the mainstay of production. It is also the great absorber of capital, and for that reason a constant danger to the financial efficiency of a business. Unless it is properly maintained, production must suffer. If it oversteps the limit of actual requirements, it is absorbing capital that may be vitally necessary for the operation of the business. Stock records are, therefore, of great importance, as it is on them that a business must depend for information that will enable a proper balance to be maintained between production (or purchases) and requirements.

Simplified methods of handling stock can be designed by closely classifying it into distinct divisions. A useful basis for a primary division could be made as follows : *Classifications of factory stock*

- Raw material stock ;
- Finished material stock ;
- Miscellaneous stock (odd parts, &c.), waste, and by-products ;
- Equipment stock ;
- Tool stock ;
- Office material stock ;
- Drawing stock.

In a very extensive business each of these may require its own special department. Even in a small business, where stores of all kinds have to be handled by only one or two departments, it is advisable to closely distinguish between the various classes of stock handled, as by this means any subsequent analysis of stock used is considerably simplified.

Raw material stock is best classified by materials. Being unmanufactured, such stock has not received any definite reference number, and is therefore not affected by any other

methods of classification adopted in the factory. A practice that greatly facilitates the handling of raw material stock and records is the coding of basic materials. By giving each distinct class of material a special code reference letter (or letters) its marking and recording are facilitated. Once these letters have been arranged, they are easy to remember, but their arrangement in the first instance will depend on what other methods of reference are in use, and it is best to avoid any coding which might in any way be mistaken for something else.

Simple letter combinations, closely associated with the actual names of the material, are by far the best to use when arranging material codes. The use of such combinations as CI for cast iron, WS for wrought steel, SA for sheet asbestos, and RF for round fibre make the code simple to arrange as well as to remember. The adoption of such a code throughout the entire factory will simplify many records considerably. It is especially useful to the drawing office in making up material specifications, and to the storekeeper in preparing the material portions of the job orders, as it saves not only space but time. When material is coded in this manner the code itself provides a definite basis for the separation of material in the raw material stores as well as in the store records.

The records of the raw material stores will not need to be elaborate or extensive. Card indexes of material stocks in hand, showing balances and material required or on order, with duplicate books for ordering further stock from the buying department and for notifying departments of stock delayed, will meet most of its requirements. The use of card records is preferable to bound volumes in stores, as books get badly soiled and damaged, while cards, after completion, can be taken out and filed away for future reference, leaving the indexes with nothing but 'live' information in them.

Raw material stock cards should be indexed by material and sub-indexed according to the various classes of such material. This makes it an easy matter to assemble cards of each material together for totalling the stock used over a certain period.

*Material
inwards*

In dealing with material received, the raw material stores will list the quantities and weights on the copy of the original order supplied by the buying department, and in the case of material received for which no order is in hand, a separate notification must be sent to the buying

department. All stock received will require inspection, and while in some cases this may be carried out by the storekeeper, in the case of stock ordered on technical or chemical specifications separate inspection will need to be made.

It is unnecessary for the storekeeper to withhold the advice to the buying department until this inspection has been carried out, as it is important that the buying department should know of any goods received as early as possible. In the case of a complaint regarding any material delivered, the inspector should supply the storekeeper with a special complaint notice, and this should then be filled in with necessary particulars of the order and goods, and sent to the buying department.

Inspection of material

When special inspection has to be carried out, the advice to the buying department notifying delivery should specify that the goods are 'not inspected.' Goods on which no special inspection is necessary, but which are passed by the storekeeper, can be advised, on the notification of delivery sent to the buying department, as 'inspected.' A list of all goods inspected and passed each day should be sent to the buying department to complete the records.

Any system adopted for the use of the finished stores must be considerably broader in scope than any other of the stock record systems of the factory. It will depend considerably on the internal organisation, what actual records are used in the finished stores, as it is advisable in some cases to concentrate at this point many records which in other businesses would be scattered through such departments as the drawing office, cost office, or the buying department. In suggesting bases for systems in this volume, therefore, it must be understood that the records shown are not necessarily confined to the departmental system in which they are given, as what may in one case be a part of the system of the drawing office may need, in another, to be incorporated in the system of the finished stores or some other department.

Certain manufacturing businesses lend themselves to a great amount of simplification in the planning of records, owing to the standard character of the work handled, and in many of these businesses it is possible to give consecutive part numbers to everything manufactured, which numbers rarely need to be changed. The number of such businesses is small, and their internal systems are generally easy to handle, so that in treating the stock system of the finished

800

COMPLAINT

800

191

COMPLAINT

Goods complained of
 Date they were received
 To what quantity or number does complaint apply
 Why complained of

191

(Signed)

Examiner

Remarks by Stores Manager

Where Goods received from
 Number of order

(Signed)

Complaint rec'd by Buying Dept.	Supplier advised	Reply rec'd
Instructions issued		
Debit Note No.	Date sent	Goods returned
Credit Note No.	Claim made	Claim No.
		Goods rec'd in exchange
		Complaint settled

(Signed)

A COMPLAINT FORM USED FOR GOODS WHICH ARE NOT IN SATISFACTORY CONDITION, OR WHICH ARE NOT OF QUANTITY OR QUALITY ORDERED. THE FORM ACCUMULATES ALL NECESSARY INFORMATION BEFORE REACHING THE BUYING DEPARTMENT

No. of Bin.		Article.										No. of Part.		Class		Max.	
74		Compression tank										10074.		463		36	
Date	of	Received	Delivered	Order No	Total	Ordered	Date	Date	of	Received	Delivered	Order No	Total	Ordered	Date of		
June 30		10074	10074	504	19			Nov 26				2 3522	15				
July 1			1	504	15							1 3530	14				
July 2			1	509	14			Dec 12				1 4402	13				
	10		2	464	13							2 4750	11				
	15		2	817	11							1 4799	10				
	19		3	910	5							1 5124	9				
Aug 12		24			33							1 5124	9				
			1 1456	31				Jan 5				1 4582	33				
	23		3 1753	25								1 4582	33				
	24		1 1551	27													
Oct 25			1 1942	26													
Oct 15			2 2433	24													
	22		2 2757	22													
	23		1 2762	21													
	26		1 2840	20													
Nov 1			1 2950	19													
	5		1 3005	18													
	6		1 3098	17													

A SIMPLE STOCK LEDGER CARD, WHICH ASSOCIATES THE PARTS WITH THE VARIOUS PRODUCTS, AND ALWAYS SHOWS THE ACTUAL STOCK ON HAND

stores, it will be from the point of view of the more extensive plant.

When products are classified for drawing office purposes as described in the chapter on the 'Drawing Office', a basic number is provided which can be utilised with the part numbers so as to definitely identify any part. This will enable the finished parts to be distributed in the stores according to products, and to be indexed in the same way, and will preserve the same part number in the stores as the part has on its drawings and specifications. *Classification of parts*

In the case of standard parts which are used for many different products, such as bolts, screws, springs, &c., it is obviously impossible to list these by each of their special part numbers. These should be kept separate from the ordinary finished parts in the stores, both in the racks or bins and in the records, as stock in such cases is not affected by the requirements of a single product, but is standard stock which needs to be maintained separately. Such parts should have a standard number, which should originally be given by the stores. This is necessary in order to enable the stock of such parts to be kept in consecutive order, and while the storekeeper can easily plan his accommodation to this end, the drawing office could not properly distribute numbers in such a way as to adjust the parts to the internal arrangements of the stores.

These standard parts having a distinct part number as a part of some product, and also their own stock number, must be known to the drawing office, as well as to the stores, by each of their numbers. This is simple, as practically every part in use must originate from or be authorised by the drawing office, and when a part is specified which is not in stock, it is a simple matter for the drawing office to send a notification to the stores that the part is to have a stock number given it, and a stock card opened. The number given is then entered on the notification, which is returned to the drawing office, where the stock number is entered on the ordinary specification record of the drawing office. Any specification issued can then state either the actual part number or the stock number, or both.

Records of part numbers given to stock parts should be noted on the stock record card, as this is a valuable guide when calculating stock margins. The entry of the part number identifies the part with certain definite products when production is scheduled, and if it is found that certain *Associating parts with definite products*

products are increasing or decreasing in demand, it is possible to adjust the stock margins to suit. In a big factory it is a great help to this end to list all stock parts used in each standard product on a card (or cards), which can be filed behind the records of manufactured parts of the same product. Then, if the schedules are varied, the list of parts of each product is immediately available, and adjustments can be made to suit the altered demand.

Where many small parts are used it is often an advantage to fix samples on the stock bins, as also to make up numbered sets on boards, so that parts cannot be confused with other parts of the same type used in other products.

*Stock
margins*

In cases where a great measure of control is vested in the drawing office, the responsibility for revising stock margins may centre there, but in practice it is found better to avoid any undue centralisation of responsibility at any point, as the more equitable the distribution of responsibility is made, the greater the all-round efficiency of the organisation is likely to be.

Specifications of products to be manufactured centre first at the finished stores. As has been already explained these should always provide spaces for records of stock to be entered, and it is on the basis of this analysis of parts required that the finished stores must issue its orders for production. When a stock of any part is maintained, the number of parts actually in hand may be reserved for an order, if it is urgent, and a production order issued for further stock to make up the deficiency. But as far as possible, it is advisable to retain the minimum margin of stock, and to issue orders for production whenever such orders have any chance of being completed within the time. Stock margins, when maintained, should be reserved only for special emergencies, such as repairs or very urgent orders, to make up deficiencies of jobs which have produced a number of spoilt parts. It is necessary, therefore, for the storekeeper to be able to watch closely the details of stock entered against a specification, and any entry columns provided for his records should be very full and complete.

*Production
orders*

From his records of stock, entered against the specifications, the storekeeper can prepare his job orders. These link the entire production system together, and will be fully dealt with in a separate chapter. They affect the stores systems greatly at this point, as their issue involves

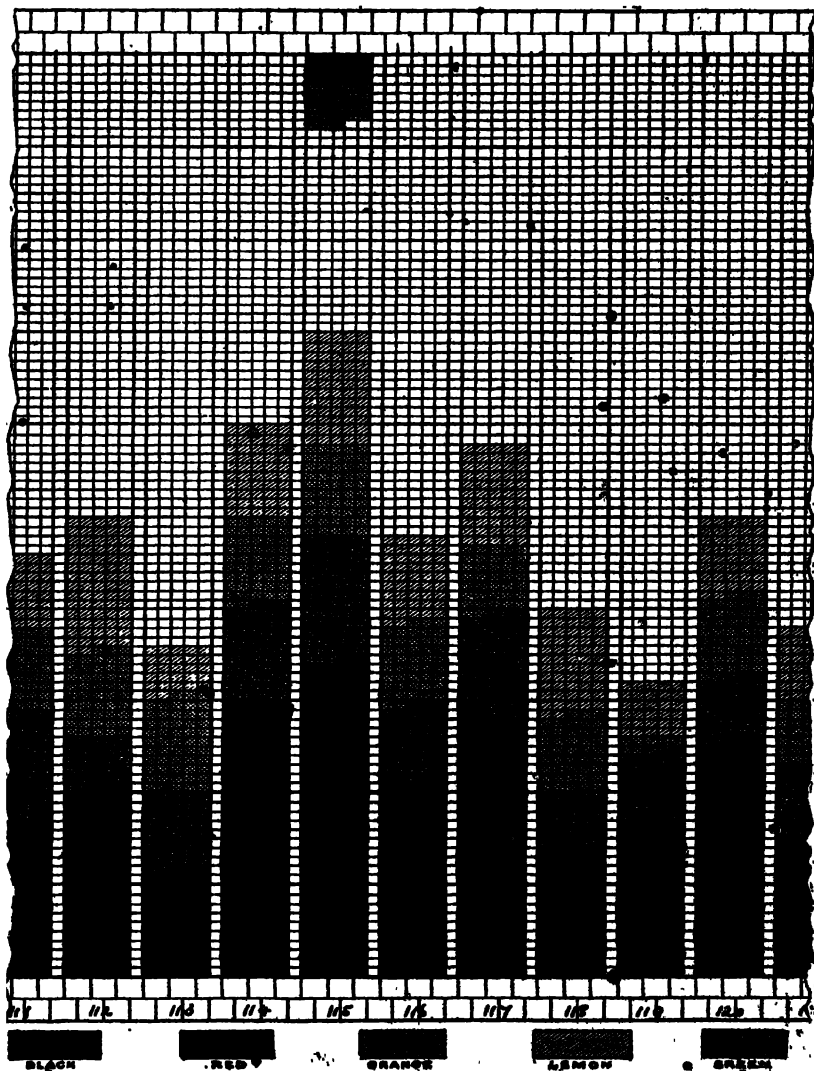
the preparation of material specifications for the first department concerned in the work, and also the arranging of raw material and originating department material. Every job order issued will entail the issue either of instructions to the raw material stores for raw material, or instructions to the originating departments for the production of manufactured raw material, the latter naturally including the issue of instructions to the raw material stores for material to be issued to the originating departments.

This brings into being a supplementary job order for the preparation of manufactured raw material, and this can be dealt with in the same way as the ordinary job order, with the exception that while a copy must be sent to the cost office in the usual way, the order need not be taken into account by the progress department. The progress department exists to control production from the point where it leaves the control of the stores. Prior to that the preparation of raw material is the sole consideration, and progress on that is controlled by the buying record system on the one hand, and the stores records of originating department job orders on the other.

Completed job orders are sent to the stores by the inspection department with the finished parts, and after these have been verified and taken into account on the stock records and on the specification sheets, the job order can be filled in with details of parts received in good condition, and sent to the cost office for record purposes there. All job order numbers are noted on the stock records when parts are taken into stock, so that a definite link between the production details and the stock is maintained; and at any future date the entire course of production of any single part can thus be traced through the records, if necessary.

Supplementary to the records entered on the specification sheets, it is often possible to visualise the stock conditions of an order by the use of stock charts, and these are made up at the same time as the corresponding entries are posted to the record. The use of a stock chart will frequently do more to speed work and prevent delays than the entire records of the progress department, as it keeps prominently before the storekeeper the actual condition of stock as it affects production. *Stock charts*

Given twenty-five parts to a particular section, all of which are due for assembly by January 25, the progress



SIMPLE FORM OF STOCK AND PRODUCTION CHART

There are many ways of using this type of chart, but this example is used as follows: Parts ordered are coloured lemon or orange, according to the class of order; parts in course of manufacture are coloured red; and parts complete are coloured black. Reserved parts are entered in green at the head of the column until used, when black is filled in to show they have been taken into account as used parts.

records keep them within schedule time if possible. But a stock chart will show at a glance the relation of every part to the rest of the machine or product, and if twenty-three of the twenty-five parts in the section are ready for assembly on January 12, and the rest of the machine is correspondingly ahead, the storekeeper can revise his time schedule on the remaining parts, and possibly gain a full ten days on his finished part schedule by so doing, leaving a wider margin for emergencies in the assembly and finishing departments. In some businesses it is possible to make a stock chart of this kind serve the purpose of a progress record as well, and reference to the various forms of stock charts described later may suggest suitable forms for a great variety of businesses.

Linked closely with production and stock-keeping is the *Tool stock* problem of tool stock. This is, literally, a section of equipment stock, but is equipment stock which is part of the equipment itself, while materials treated as equipment stock in the ordinary stores are those required for maintenance purposes, and which are not returnable when once issued. This provides a method of distinction between equipment stock handled by the ordinary stores and equipment stock which is under the control of the tool stores.

When heavy stocks of tools are maintained, as is frequently the case in engineering businesses which are operated on premium or efficiency systems of labour payment, it is advisable to number all important tools, as well as standard templates or other equipment used for ensuring accuracy, and to keep a careful record of their use. The creation of tool stock will usually be the result of co-operation between department managers and the chief tool-maker, and if the latter is assisted by efficient records of the amount of usage the stock receives, it is possible to keep the tool stock at a minimum without affecting production by lack of tool equipment.

It should be made a definite policy, whenever possible, to issue valuable tools, of which only a small stock is kept, only on the signed authorisation of a foreman, who should indicate the job the tool is required for and the normal time it will be in use. In the case of faulty work which may be caused by the issue of a wrong pattern or a damaged tool, the actual tool issued can then be traced; and if a tool is required by another department, reference to the demand will indicate the time it will be at liberty.

*Tool
records*

Standard tools should be issued to workmen in exchange for tool checks, bearing their time number. Tools issued in this way can be exchanged for freshly ground tools as often as may be necessary, the check remaining in the possession of the stores until a tool is handed in in exchange for it. Workmen are then responsible for tools taken out by means of their checks, and in the event of a workman leaving he must hand in his proper number of tool checks before his wages are paid. This system makes it unnecessary for the workman to obtain authorisations for ordinary tools required, or to sign for them when issued, and under any system of production which relieves the workman of all miscellaneous work outside straight production a system of this kind is necessary. The tool checks are hung on the boxes or partitions from which the tools are taken, and the man's number is entered on the record card of tools issued.

These tool record cards should be in very simple form, and, if necessary, may be posted from a rough book made up in pencil as the stores are issued. The cards are chiefly for purposes of analysis, and subsequent reference in special cases, and only have their greatest efficiency in a large business. In small factories, the use of a continuous record of stores issued and returned will generally meet all requirements, as in handling small quantities of tools stock adjusts itself to requirements far more readily than in extensive businesses.

When any measure of reliability can be placed on the clerks or boys in the tool room, a simple method of recording tool stock issued and returned is by the use of cards affixed to the boxes or partitions from which the tools are taken. The entry of the check or authorisation number, date, and time takes but a few seconds in such cases, and separate records for each tool are thus kept with little trouble. Records made up in this way, however, are rarely reliable, as in a rush period entries are apt to be missed or left over; and while a record of the kind may be made use of as a general indication of tool stock used, the permanent list of stock in and out should also be kept to ensure an accurate record always being available.

In dealing with important tool stock issued on written authorisation, as well as in dealing with the stock of the ordinary stores, a useful method of ensuring accuracy in filing records is to use a numbering machine. The authorisations are numbered with this as dealt with, and the same number is printed in the column of the stores day book at

the same time. Errors in entering numbers or in filing can thus be avoided, as it may frequently happen that authorisation slips from different departments may bear the same number, and while colour variations can be adopted to distinguish the slips of the various departments, the entry of two similar reference numbers may lead to confusion. The machine prints the stores consecutive number on each slip received, and these numbers serve as a reference in the stores ledger. The original number of the slip is entered in the book as well, and the numbered slips are then filed away in consecutive order for future reference.

Control over certain tool stock, such as dies, is also maintained by the drawing office, which maintains permanent records of all such tools made, and controls their use on jobs in the same way as it controls the use of patterns.

Of the remaining classifications of stock, the drawing *Drawing stores* stores stock entails some variations from the usual methods adopted in controlling stock which are of special interest. Control over all drawings issued is maintained by the drawing office records, which have already been described. The control over drawings in constant use devolves on the drawing stores or its equivalent. The main records of the drawing stores must cover :

Drawings issued and returned ;

Drawings of standard parts which are in constant use and which are not held in stock, but which must be kept track of ;

Drawings withdrawn, and required to be returned to the department which originally had them.

Records of drawings issued and returned need not be maintained as a permanent record, as tool issues need to be. The simplest method of dealing with drawing stock is to use an index composed of guide cards only, the cards representing the different drawings in use. Any department requiring a blue-print from the stores must then issue a simple form of demand, and on the issue of the drawing this can be filed behind the guide card as a record of the holder. When the drawing is returned, the demand is taken out and handed back as a receipt, when it can be destroyed by the foreman who issued it.

In many businesses, where a considerable amount of stock production is carried on, it is found necessary to keep certain standard drawings always available in some of

STAMPING No.

TITLE

S.....

DIES, the Property of:—		No. of Sets of Dies.	Weight of Stamping.	MATERIAL
Stamping Deg. No.		ALTERATIONS TO DIES.		
Used for:—	PT. DRG.	PT. DRG.		
PT. DRG.	PT. DRG.	PT. DRG.		
PT. DRG.	PT. DRG.	PT. DRG.		

ORDER No. & DATE.		DIES MADE BY, & DATE.	
Sample Stamping Checked.	PASSED.	Sample recd. in Stores by & Date.	SHELF No.
DIES AT:—		ON	19
			19
			19
			19
			19
			19

CERTAIN TOOL STOCK MUST BE ACTUALLY CONTROLLED BY THE DRAWING OFFICE, AND THIS CAN READILY BE DONE BY SUCH RECORDS AS THE ABOVE, WHICH SHOW THE BACK AND FRONT OF A DIE RECORD CARD.

the departments. A simple method of dealing with these is to prepare them in standard sizes, and to mount them on light metal mounts, each mount having a drawing on each side. These mounted drawings are then inserted in a rack vertically, and swing from pivots at the back. The rack itself can be kept locked, so that the drawings cannot be

FROM		DEPARTMENT	
TO DRAWING STORES			
Please deliver to			
MAN'S NAME & CLOCK No.			
Drawing No.			

DEMAND NOTE ISSUED BY THE FOREMAN OF A DEPARTMENT
TO THE DRAWING STORES

removed, while the pivots make it easy for anybody to refer to them.

Records of all such drawings should be kept by the drawing stores in the form of special permanent cards filed behind the guide cards of the drawings. Periodical inspections should be made to ensure the sets being complete; and if any drawings have to be withdrawn from circulation, the card records will indicate their position.

When the number of blue-prints in use is limited, it often occurs that one has to be withdrawn from one department for use by another for a time. In such cases any delay in returning the print may cause delay in production, and possibly prevent a man from proceeding with his work. All drawings withdrawn in this way should have attached to them a special 'urgent return' slip, which should be so prepared that in case a drawing is returned direct, means of informing the stores is provided. It would be an obvious

*Control-
ling use of
important
drawings*

waste of time for a draughtsman who has withdrawn a drawing from a department for a short time, and who had to pass through the department, to take the drawing to the stores and compel the workman to fetch it from there again. By making the slip returnable to the stores in the absence of the drawing, this is simplified.

The drawing stores must keep a record of all drawings temporarily withdrawn in this way, and must follow them

NOTE: <i>This slip must be returned to the Drawing Stores</i>		
<u>URGENT</u>		
RETURN TO		
WITHOUT DELAY		
ISSUED TO	M	19
RET'D TO STORES	M	19

URGENT RETURN SLIP ATTACHED TO DRAWINGS WITHDRAWN FROM
DEPARTMENTS THAT ARE REQUIRING THEM

up if they are delayed, so that too great an importance cannot be attached to the necessity for prompt delivery of any slips notifying direct return.

The methods of handling stock of various kinds as already described will cover the requirements of many of the remaining classifications of stock, and in other cases the problem of dealing with certain special classes of stock will be found dealt with under subjects which are more directly related to the material concerned than to the ordinary stock-keeping sections of the business.

CHAPTER V

PRODUCTION, INSPECTION, AND PROGRESS. RECORDS.

Production Orders and Their Uses : Overlapping Production
Schedules : Inspection Records : Progress Records and
Charts : Various Methods of Recording Progress Details :
• Speeding and Controlling Production

WHEN products consist of a number of complete manufactured parts or sections, manufacture has to deal with each part as an individual product, and production orders must be issued for each part or for each batch of parts of the same class. While there are wide differences between other sections of manufacturing businesses, according to the class of product handled, the handling of a production order will vary comparatively little whether it is for a single part or for a complete product. Businesses which have no separate part production can thus gain useful ideas from the organisation of a business which is operated solely on the manufacture of individual parts, as the same measures of control and the same requirements of information apply to a great extent in each case.

In the present chapter the job order, or production order, will be treated solely from the point of view of the plant where part production is carried on, so as to link the records more effectively with the methods described in other chapters. Job orders are based on the specifications generally issued by the drawing office, which are first checked against the stock available. They must link with records in two departments—the drawing office and stores—and must show the necessary reference numbers to link them with every associated record in these departments. In part production, separate job orders are issued for every batch of parts of the same kind, and as the material specification must be entered on them in some form or other, it is simplest to make it the material demand slip, which can be detached by the department that is first concerned with the raw material.

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Issued with the job order, and accompanying the jobs in the course of manufacture, must be a reference tag without which no parts are accepted by the inspection department.

Job orders must specify not only material and manufacturing details, but operations. Many departments are con- *Production order details*

Quantity	
Part No.	
Description	
Batch No.	
Job Order No.	
Part Drawing No.	
Pattern No.	
<p>This tally must be attached to one of the pieces of the job, and no job will be received without the tally, giving the above information</p>	

O

A JOB ORDER TALLY, ISSUED WITH THE JOB ORDER SO THAT THE PARTS CAN ALWAYS BE IDENTIFIED DURING THE COURSE OF MANUFACTURE

cerned in the operations performed on an order, and it is not advisable for each of them to have to work out the progress of work for itself. By listing each distinct operation on the job order in proper rotation, therefore, greater facility in posting details is provided for. In addition, by definitely indicating the course of work through the departments, its handling in the factory is facilitated.

With operations detailed on the job order, it is obviously a simple matter to specify definite time limits for each. The time limit for the complete order will be created by the time the complete section, of which it is a part, is to be ready for assembly. Operation times will, therefore, vary, as a part that must go through fifteen operations has far less latitude than one which has only to go through two; and unless production is controlled by means of specified times, the one part may take two days and the other fifteen, with the result that a complete section may be held up awaiting odd parts that have been proceeding slowly through the various departments. So long as definite time limits can be fixed for the complete order, they should also be either definitely fixed or be controllable for the operations, though it must always be understood that times set are 'limits,' and not actual dates on which operations must be completed.

*Classifying
production
orders*

When production is definitely scheduled in this way, it is advisable to distinguish between various classes of production orders.; Ordinary production orders must always be regarded as important so far as the time limits are concerned, and foremen should understand that such orders must go through within the operation times allowed. On urgent orders, however, the foremen must understand that the time limits are only set to ensure definite delivery by a fixed date, and that they must use every effort to improve on the times and speed the job along. The third class of production order, which might be termed supplementary stock production, need rarely be regarded as of importance so far as operation time limits are concerned; and these could in most cases be omitted entirely, though it is advisable, as far as possible, to always indicate a definite time limit for the completion of the order.

Time limits adjusted in this way ensure work being handled in the order of its importance, without interfering with the adjustment of production by the departments concerned. Without such control over production, an order may be left aside for weeks owing to pressure of other work of seeming importance, or which appeared to fit in better with departmental conditions. When fixing time limits, it is well to bear in mind that production schedules will, in innumerable cases, overlap; and production time schedules should be primarily based on a complete production schedule for the order or product. It would rarely be possible, for instance, to complete all originating department

PRODUCTION, INSPECTION, Etc., RECORDS 325

productions before actual manufacture was commenced; or to withhold sections from the assembly department until the finished parts of every other section were in hand.

This important fact must result in the overlapping of schedules in such a way that while the various departments continue to maintain production at a point that will keep the remaining departments supplied with work, it may be possible for the originating departments to be at work on parts while the finishing department, on the other hand, is dealing with advance sections of the same product. This is an extreme result, but, under normal circumstances, certain parts will be found to require only a fraction of the time necessary to produce others of the same section, and overlapping schedules will enable the whole to be distributed in such a manner that the parts comprising each section reach the stores as finished parts ready for assembly at approximately the same time. Some sections, again, may be planned to arrive ahead of others, and in this way production can be properly balanced throughout the entire factory.

• Scheduled dates, so far as they affect the completed parts, are naturally within the province of the finished stores. But as the stores is in no way concerned with labour records, or with actual production, it is obviously impossible for any efficient system of operation time schedules to be under its control. Labour records, and details affecting production, centre at certain points in the factory office, and it is advisable to have these points together as far as possible. Cost, labour, bonus, and progress records are all linked closely, and by concentrating them in one department reference is greatly facilitated, and the duplication of records is avoided. With production records centred in this way, the scheduling of operation times presents little difficulty, as it is, in any case, necessary for the job order to pass through the factory office before production commences. During its progress through the factory office, it must take up its supplementary details, such as the specifications of operations; and any time adjustments affecting these are best planned by the department or individual handling the operation records.

Job orders must follow the work through to the end of its production. After all final details have been entered, and the details of the order posted to the records of the factory office, the job orders are sent direct to the first department concerned in production. Here the foreman can file his

*Overlapping
production
schedules*

*The
course of
production*

orders by dates, and can take up the question of material with the raw material stores as described in another chapter. On completion of the operation, the orders and job label are handed in with the work and the workman's time record to the inspection department, where the work is verified, and the details noted on the order and on the time record of the workman, after which the order goes out again with its label and parts to the succeeding department. On the final completion of the order, the finished parts are sent with the job order to the finished stores, which posts its records from the complete order, afterwards sending it to the factory office for final details to be posted and for filing. The label remains in the stores as its record of orders handled.

• Conditions may occur in factories which make it vitally necessary for departments to know what work may be expected some time in advance. In such cases, many firms make copies of the important details of each order for the departments concerned. Where circumstances permit, and the labour entailed is not excessive, it is often possible, when the orders are being dealt with by a progress clerk, to list departmental operations, with scheduled dates in and out. Continuous records of orders issued, when made up in this way, frequently facilitate the planning of work by the departments, especially when certain machinery is occasionally being worked at full pressure; and, on the other hand, a departmental record of this kind is a useful addition to the records of the progress department as well. When used, it brings pressure to bear on production from two points, the progress department watching work that is delayed, and the departments that are short of work being able to make demands for definite orders to be pressed forward so as to enable production to be adjusted to better advantage.

*Inspection
records*

Few records are necessary in the inspection department, as it is merely a verifying point, and cannot be made a serviceable point for any specific information to be centred at. Receiving the work with the job order and time records, its duties are to verify the operations performed, and to reject any parts that are unsatisfactory or damaged. Details of these are then entered on the workman's time card, which is passed on to the time office for posting purposes. All reductions in the number of parts are also noted on the job order, and when this is next issued, it is with the number of parts left in the course of manufacture. A con-

PRODUCTION, INSPECTION, Etc., RECORDS 327

secutive record of all work dealt with must be kept, and from this notifications of spoiled parts are prepared, and sent with the parts to the stores.

As the job order may be still in use in the factory, and as time records are generally required for posting purposes and must be carefully filed and preserved, it is advisable to make notifications of spoilt parts in triplicate, one copy going

INSPECTION DEPT.		
To STOREKEEPER:		
Please receive the following faulty parts from Job Order No.		
Usable	Man's Scrap	Mat'l Scrap
191		
Inspector		

A NOTIFICATION OF FAULTY PARTS SENT TO THE STORES BY THE INSPECTION DEPARTMENT

with the parts to the stores, another being kept as an inspection department record, and the third copy being sent to the factory office for posting to the workman's efficiency record, and for use in making up records of spoilt work. The manager of the inspection department may be left to decide what parts are actually scrap metal, and whether any parts may have a future value as miscellaneous stock or not. In the case of scrap metal, the raw material or waste stores would receive the parts; while usable parts would be sent to the finished stores.

It would be possible to use a fourth copy of the notification in the latter case, which could be sent first to the stores with the parts, and subsequently passed on to the drawing office as a notification of miscellaneous stock received, with the stores stock number added, though a preferable system is for the stores to make a list of all such parts received into miscellaneous stock. Parts thus sent to miscellaneous stock could be so noted on the factory office

copy of the notification—which should also go to the stores in the first instance for the miscellaneous stock number to be entered—and could be allowed a nominal percentage of their value, instead of being treated as scrap or waste. Records of such stock would then be available for costing purposes if the parts were used again.

*Progress
records*

Progress records must vary considerably according to the class of business, and alternative methods of dealing with them will be suggested, so as to show the application of the principle. In factories where production entails a great number of individual operations, none of which absorb much time or labour, individual job orders are not used, and any orders issued are for a complete product. As an instance, the making of a pair of shoes, under modern conditions, may entail fifty or sixty operations, yet the whole labour value incorporated in the shoe when completed may be less than a couple of shillings, and certain operations may have entailed the expenditure of but a fraction of a minute of an employee's time.

*Departmental
progress
records*

Detailed systems of recording progress under such conditions cannot possibly be based on any ordinary time record, as even under a system of time cards for each operation an order may have passed through half a dozen subsequent operations before its progress can be recorded. A useful method when the number of operations is great is to issue departmental job orders in card form with all possible operations indicated on the side in rotation. Against these are spaces for the stamping of marks representing operations to be or not to be performed, and these spaces are detachable. When an operator completes an operation on order, the space representing it is detached, the operator's number stamped on the back (as well as on the card) for labour record purposes, and the space is dropped into a box. These boxes are cleared frequently during the day, and the records of departmental progress are posted from the contents, which also provide records of work done for the wages records.

The various departments then make up notifications of all orders handed on to subsequent departments, and from these an office progress book is posted. In this way the office can always keep in touch with an order, as the progress records show the department it was in the previous evening; while any inquiry or instructions regarding the actual order can easily be carried out by reference to the departmental progress record. This latter is frequently made up

B. 2. §

	Check No.	No. Pairs.
59 Sockings	39	12
58 Slipping Lasts	58	12
56 Rubbing up M.	56	12
55 Prepare for R.M.	55	12 B
47 Clean Sprigs, B.	47	12
48 Red Round	48	12
44 Patch Foreparts	44	12 D
40 Pad & Brush W. & T.	40	12 D
37 Color Waist & Top	37	12
35 Prepare Bottom	35	12 G
34 Scour Bottom	34	12
33 Stitch Wheel	33	12 G
32 Edge Setting	32	12 G
29 Seat Wheel	29	12
28 Heel Bursish	28	12
27 Coloring Heels	27	12
26 Heel Scouring	26	12 G
25 Heel Trim	25	12
24 Pare Fore	24	12 G
23 Stitch Separate	23	12
22 Plough Out	22	12 G
21 Put in Lasts	21	12
20 Heel Pare	20	12
19 Heels	19	

[illegible]

B

- (A) A 'COMPLETE' PRODUCTION ORDER USED IN A BUSINESS WHERE PART PRODUCTION IS NOT POSSIBLE. THE EMPLOYEE'S CHECK NUMBER IS STAMPED ON THE BACK OF THE DETACHABLE OPERATION SLIP, AND IS ALSO ENTERED ON THE ORDER ITSELF.
- (B) A PROGRESS RECORD FOR A 'COMPLETE' JOB ORDER, WHICH IS KEPT IN THE OFFICE TO CONTROL WORK IN COURSE OF PRODUCTION.

in such a way that it serves as a preliminary wages record as well, and the actual wages books are then posted from it.

*A Swiss
progress
system*

Another useful method in use for orders where the number of operations is small is used by a Swiss watch factory. In this case each order is given a card, which is filed away in the office for reference. When this card is issued, a set of numbered slips of the same number as the card is issued to the factory, with manufacturing or assembly instructions.

Order Sheet No. Name

Left my Dept. for Dept.

Date

Signed

Foreman of Dept.

**A PROGRESS SLIP USED TO TRACE WORK AS IT PASSES FROM
DEPARTMENT TO DEPARTMENT**

All parts concerned in the order are then put in boxes with partitions, the various divisions representing the parts concerned in each operation or department. As each operation, or the work of a department, is completed, the slip representing it is torn off, and the office messengers collect the slips from special boxes during the day. The slips show the workman's number, and from these the labour records are posted. The slips are then pasted on the office record cards in spaces provided for them, so that everything relating to the order is concentrated on a single card record, which can be looked up at any time.

The 'v' marks along the edges of the card shown are cut out with a punch to classify the order and its details. The card is thus permanently marked with its special classification, which cannot be altered; and in sorting the cards it is impossible to make a mistake, as the cuts of each class must

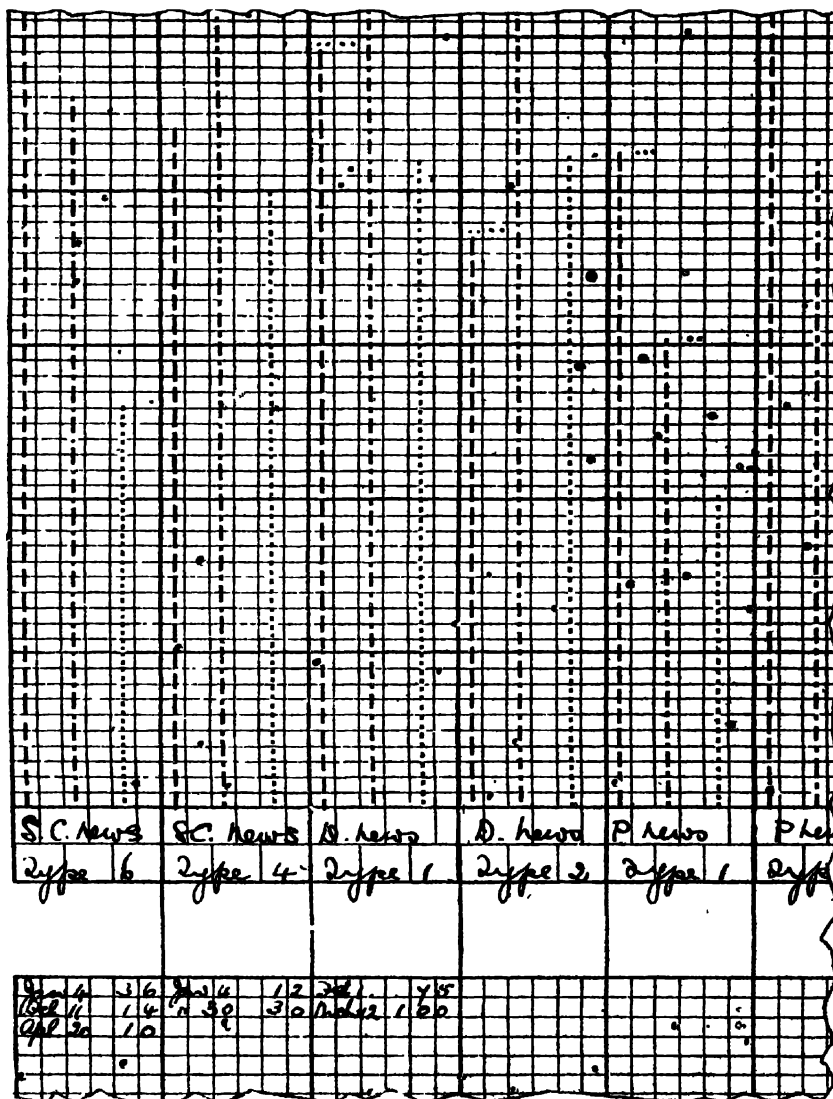
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register, and a card in its wrong position is thus immediately disclosed.

Where production consists of the separate manufacture of distinct parts, which are later assembled into a complete product, altogether different methods need to be adopted. As has already been explained, progress records in such cases are best linked with the job time records and the individual job orders. As a department of the ordinary factory office, the progress department can take over the job orders after all details have been issued on them, and before their issue to the factory. Each of these job orders will give the complete order number, the job order and part numbers, the operations to be performed, and the time limits on each. *Progress records for part production*

Progress, while it can be recorded in books or on records, cannot be accurately controlled by such means unless special date records are kept, and even in such cases the work is exceedingly difficult. When progress is recorded on a chart, however, every detail affecting an order is visible at the same time; and a greater degree of efficiency in controlling progress can be achieved by this means. A chart can be used for every complete order, and from the job orders issued, or from complete lists of job orders prepared by the stores, the various columns can be made up, one to each order. In the columns code letters representing operations or departments, or both, can be entered, with or without individual operation dates as may be found necessary. At the top of each column the final date for the completion of the section comprising the part is entered, and, above all, the date for completion of the order itself, or of the section as a complete unit.

Chart records of this kind can be used in a variety of ways. *Progress charts*
When scheduled dates do not cover a long period, the horizontal lines of the chart may be used to represent dates, and the entries can be made in the columns to correspond. On completion of the operation, the entry can then be crossed out, and by using one kind of ink for jobs ahead of time or on time, and another kind of ink for jobs which are behind time, it is possible to show prominently on the chart the jobs which are getting delayed. When production extends over a considerable period, it is not possible to use date lines on the chart, and in such cases any actual operation dates must be entered in the spaces themselves, though even in such cases it is frequently found possible to use certain lines to represent definite dates, and to enter all

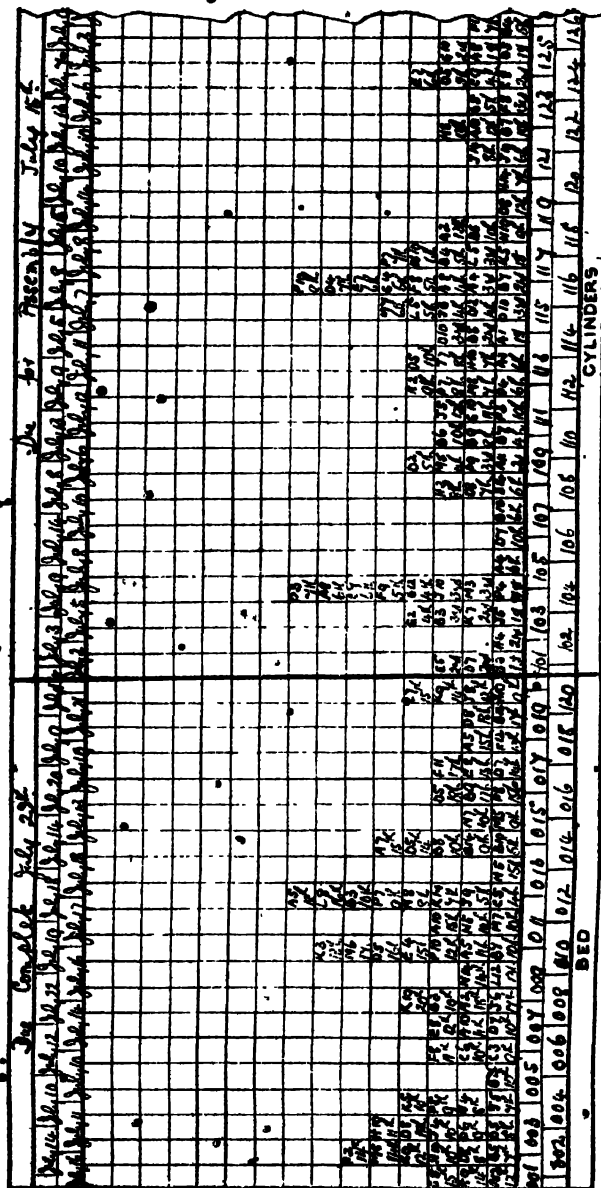


A SIMPLE FORM OF STOCK CHART

The green line (here shown by dashes) represents orders in hand; the red line (dot and dash) represents actual deliveries; and the violet line (dots) represents stock manufactured. In the lower section all heavy deliveries due on contracts are noted

C TYPE ENGINE

ORDER NO. C-479 PROMISED FOR AUGUST 30th



ONE TYPE OF FACTORY PROGRESS CHART

The operations and departments are noted in black in the squares. Dates of completion are then entered in the squares in green, if on time, any parts behind time being entered in red. Every delayed part thus shows prominently on the chart.

operations before that date below, and any after the date above, the line.

Another variation in the method of entering details may be used when no definite operation dates are fixed. In certain cases it is unnecessary to fix certain definite operation dates, either because of the interference with the ordinary course of production they might be likely to create, or because

URGENT

**THIS ORDER MUST BE HURRIED
ALONG WITH ALL POSSIBLE SPEED**

To Foreman of

Dept.

This slip must be attached to Order
No. If the Order has left your
Department the slip must be sent immediately to Dept.

**A SPECIAL 'RUSH' SLIP WHICH IS
SENT OUT BY THE PROGRESS CLERK
WHEN AN ORDER IS BEHIND TIME**

the operations are so standardised or so few that the progress clerk can easily control them. In such cases only the final date of completion is fixed, which is entered by the progress clerk at the head of the chart column. Code letters and figures to show the department and operation are then entered in black ink in the necessary spaces, and when progress is recorded on any job,

the clerk can check the work remaining to be done against the time limit fixed, entering the record in green if the job is keeping up to normal time, and in red if it is behind time. Red entries show prominently on a chart of this kind, and in the event of a necessity for speeding up an entire section or order, they will show the jobs to which special attention must be given:

*Speeding
and controlling
production*

Time cards, after being passed by the inspection department, should go direct to the progress clerk before being dealt with as time records. The cards will show the job order and part numbers, and will identify the order with the chart records. The operation and department will also be shown, and the recording of progress is thus simplified. For all orders which are getting behind, the progress clerk must issue special 'hurry' notices. These should preferably be small red slips, giving the order and job numbers and the name of the department. They should also contain a notification to the foreman of the department in which the order is charted as being in to hand on the slip to the next department (which can be indicated) if the order has already been passed on. These slips are then attached to the job orders, which thenceforth become 'rush'

or 'urgent,' and must be pushed forward ahead of everything else.

Progress records made up in chart form are of use for more purposes than that of closely controlling progress on each part in process of manufacture. Cases continually occur in a manufacturing business where it is vitally necessary to know definitely the exact condition of an order in its entirety. With book records of progress this will frequently entail long and difficult analysis, however efficient, the records may be for recording progress as it proceeds. When charts are used, the condition of an entire section, or even of an entire order, can be seen at a glance, and an experienced progress clerk can tell more from a set of charts after a few minutes' inspection than any factory official or clerk could discover after an hour's analysis of ordinary clerical records.

CHAPTER VI

INTERNAL AND EXTERNAL ORIGINATING DEPARTMENTS

The Meaning of 'Originating Departments': Raw Material and Manufactured Raw Material : Ordering Material : Patterns and Pattern Records : Controlling Production in Originating Departments

*What
'origi-
depart-
ments are*

AN analysis of manufacturing businesses would probably show that the majority of them make use in some way or other of an originating department, internal or external. The foundry and forge are the main originating departments in engineering businesses, and their equivalent can generally be found in other classes of businesses also. The difference between raw material and material handled by an originating department is that the one is a standard basic material, taken directly into stock and put into direct production without change, while the other is material which has to be specially prepared to meet the requirements of the particular business in which it is used.

As examples of this principle, a few industries may be taken to show the differences between basic raw material and manufactured raw material which is the production of an originating department :

Industry	Raw Material	Manufactured Raw Material
Engineering	Metal	Castings, forgings, and stampings
Textile	Yarn	Dyed, bleached, or mercerised yarn
Leather products	Tanned hides	Embossed, stained, or split hides
Biscuit-making	Flour	Blended flour

In many cases, manufactured raw material is not dealt with by a special originating department at all, but is

bought in the open market to some standard specification, *Distinctions in raw material* in the same way as ordinary raw material. A slipper manufacturer, for instance, does not usually buy hides and send them out to be split and embossed. Certain embossed types of leather are practically standard, and can be bought in the same way as ordinary hides. On the other hand, the engineering business must have its castings and forgings made to special specifications, and the textile manufacturer may require his yarn dyed to a special shade to meet his own particular requirements. Distinctions are thus created between standard manufactured raw material and specially manufactured raw material. In departmentalising production, anything that is taken direct into stock as a standard material is not regarded as originating department material, but anything which has to be specially prepared for the job, or which has to be ordered to special specifications, is so regarded.

It is always an advantage, even when manufactured raw material is chiefly or wholly standard, to distinguish it from ordinary basic material. The factory which does not operate its own originating departments may be getting full value on all work sent out; but in the course of its development there may come a time when the additional cost of having work done outside, or of buying manufactured raw material, would more than pay for the addition of one or more new departments. Close analysis of material used over a period would enable such a time to be taken immediate advantage of; whereas, without some such record, a firm may continue paying to another business collection and delivery charges and profits which could be considerably reduced or saved. This is purely a question of buying department analysis, and does not affect the principle of treating originating departments, whether inside or outside the business, as a distinct section of the organisation.

It will occasionally be found that so far as originating *Handling orders for manu- factured raw material* department material is concerned, the buying department cannot carry out its complete functions when such material is obtained from outside sources. This is more particularly the case when part production is carried on, and while the buying department must be in some way concerned with the purchase of such material, it cannot always control the details. As an instance, the castings in an engineering business may be obtained from an outside foundry. This will entail the supply of patterns and the control of such

patterns; it will entail deliveries in small lots, and the ordering of castings singly and in batches for special jobs, under special specifications, which must originate in the factory.

Orders of this kind can only originate at one spot—the raw material stores, or the finished stores if raw material control is centred there—and it would not only entail a great amount of labour, but would tend to delay deliveries and to weaken the control if such orders were made a matter of ordinary buying department routine. In such cases it is better to allow the factory to originate its orders, and, so far as questions of delivery and specifications are concerned, to deal direct with the originating department. This need not in any way affect the control of the buying department over purchase prices or over invoices.

Under any method of scheduled production the buying department would always know approximately the amount of castings required over a period, and could make its buying arrangements in accordance with the schedules. Prices in such cases are nearly always a matter of contract, covering a minimum quantity over a period. Orders issued by the stores should then be made in triplicate, two copies being kept in hand. On these, weights or quantities can be inserted as the goods arrive, and when a complete order has been delivered, one copy can be sent to the buying department for checking against the invoices as they arrive.

It is rarely necessary to make a special copy for use as a preliminary advice to the buying department of orders issued; but this can be done when orders are likely to result in deliveries which are spread over a period. It is a good principle to follow, in issuing orders of any kind, to avoid any long or inclusive instructions that may entail keeping back the complete order, while part of the goods may have already been delivered and invoiced. Such methods tend to complicate the clerical work of a business, and 'one order, one delivery' should be made the rule as far as conditions permit.

When originating department orders require the delivery of material or patterns, methods must be adopted to provide a receipt for them, and to enable them to be traced at any time. They should always be detailed on the order itself, and if an extra copy is sent for return as a receipt, a complete record of such material or patterns is always available. In many cases it would serve to have a detachable receipt

*Sending
out -
material
and
patterns*

indicating that all material or patterns listed on a certain order had been received.

Material would then be charged out of stock to the originating department, and if it was in course of production on a definite order, could be charged to that order. If not for any special order, it would come back into stock as manufactured raw material and be dealt with in the records of such material, its added cost being taken care of by the costing system of the business. In a great many businesses which use such material, the stores and cost records link up closely, and are practically the same, as the continuous variation in material cost makes it necessary to carry the cost through from beginning to end on each particular article.

The patterns of a business are generally as valuable as *Pattern* its drawings, and need to be quite as carefully preserved *records* and recorded. The pattern department is, in itself, an originating department. Its association with the organisation at the present stage is through the pattern stores. When patterns are used for the production of manufactured raw material (and not as tools in the production of finished material) the pattern stores should not be a part of the raw material stores, but should maintain its own records as a separate department.

Production orders for patterns originate with the drawing office, when drawings for new parts are issued. As the drawing office specifications of all previously designed parts indicate any pattern numbers, all new patterns required can easily be seen. Production can then be carried out in much the same way as the ordinary production in the factory, finished patterns being delivered to the pattern stores when complete.

The pattern stores should list every pattern in stock. If numerical classification of drawings is carried out in the drawing office, a basis for storing and recording will be provided by the class number of the pattern, which, with the pattern's consecutive number, should be marked on it. A card should then be used for each pattern, and kept filed in a card index. This card should record the date the pattern was issued, the order number it was issued for, and the receiver—and if issued for transmission to an outside department, should note the department it is sent to.

Responsibility for patterns taken out of the stores is simplified if it is placed on the individual issuing the orders for which the patterns are required, as such an individual

TO PATTERN SHOP.

Put in hand Patterns for
 to Drawing No. herewith changing all time to the
 above number and attaching same to Pattern.

DATE OF ISSUE DATE OF COMPLETION

ORDER
 BATH NO
 JAN

PATTERN NAME

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

PATTERN SHOP.

PATTERN NAME

BROUGHT FORWARD

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

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WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

WEEP ENDING

THIS CARD TO BE RETURNED TO COST OFFICE ON COMPLETION OF JOB
 WITHOUT DELAY.

A PATTERN PRODUCTION ORDER, ISSUED BY THE DRAWING OFFICE AND USED FOR COSTING PURPOSES

can control the handling of the patterns, whereas the pattern department itself can only obtain receipts from the persons taking the patterns out of stock. In the case of an outside originating department, the order clerk of the raw material stores could, thus issue demands on the pattern stores, showing the numbers of the orders the patterns are required

Controlling the issue of patterns

PATTERN OF				
PATTERN NO.		KIND		CUB. NO.
DRAWING NO.		NO. OF CORE BOXES		
PARTICULARS OF LOOSE PIECES				
PARTICULARS IF ON PLATE				
ALTERED TO PAT. NO.			DATE ALTERED	
USED FOR ORDER NO.	MAN'S NAME	ISSUED	RETURNED	REMARKS

A RECORD CARD USED TO CONTROL THE ISSUE OF PATTERNS. TWO CARDS ARE KEPT—ONE BY THE PATTERN STORES AND ONE BY THE FOREMAN OF THE FOUNDRY

for; and these could be used for posting the records. Any inquiry for the pattern in the future would then go through the order clerk of the raw material stores, who would be able to trace it through his order records and receipts.

When the originating department is an internal one, a simple system will suffice to keep control of patterns. As an instance, in the case of a foundry which is constantly withdrawing patterns from the pattern stores, detailed clerical records would tend to prove cumbersome. A very simple but efficient system for use in such cases is one

adopted by a well-known engineering firm in the Midlands. When patterns are completed by the pattern department, and taken into stock, two cards are made out. One of these is white, and is used as a record in the pattern vaults. The other card is yellow and has a projecting tab. This latter card is for the use of the foreman of the foundry, who keeps a similar pattern index to the one in the pattern stores.

When the foreman requires a pattern, he enters on the back of his record card the order number, the name of the moulder, and the date. This card is handed in to the pattern vault in exchange for the pattern, and is filed in front of the corresponding card in the pattern index. The projecting tabs show the patterns that are out, and an occasional inspection of the cards they belong to soon brings to light any patterns that have been kept too long in the foundry.

When the pattern is returned, the pattern clerk fills in the date, and any remarks regarding damage done to the pattern, on each card, and the foreman's card is then returned to the foundry. Any repairs or replacements required can then be advised to the drawing office, which controls the issue of orders to the pattern department. It is advisable to have pattern numbers worked on patterns so that they show on the castings, or, if this is not possible, they should be added after the casting is complete. Drawing office records of patterns should be kept both in consecutive order by pattern numbers, and in a classified index by machines and sections. In addition, it is advisable for the drawing office to keep a special card of another colour showing temporary changes in patterns. This can be made in duplicate, one copy being issued to the pattern stores. Under ordinary circumstances such special patterns which are merely temporary additions to others need no pattern number, but are kept filed with the cards of the pattern to which they relate.

With a set of records of this kind it is then possible for the drawing office to make up composite patterns from the original and temporary patterns. When a change is made in a pattern that affects its character completely, and which prevents its use again in its original form, it takes a new pattern number, and the old number is then cancelled. Any 'combinations' of patterns to create a composite part should also have their special numbers, and the old numbers should be eliminated or stopped before the patterns are used, the stopping being removed before the patterns are

filed with the card of the pattern to which they have been temporarily attached until the work is complete, after which both the extra part and the card can be destroyed.

*Pattern
orders*

Only drawing office officials, or the officials of any department authorised to order patterns, should be allowed to deal with pattern orders. These should be issued as soon as possible to the pattern department, and a copy or an advice of their issue sent to the pattern stores. Progress on them cannot be recorded in the same way as on ordinary jobs, of course; but by means of a simple date file the pattern stores can keep in touch with any that are getting behind the scheduled time for delivery, and can follow them up. The pattern order itself should be made up with a record of material used, and when complete should be sent with the pattern to the stores, where receipt of the pattern in good condition can be certified, after which the order can be passed on to the costing department.

Labour on pattern work being entered on workmen's time records by the pattern order number, it is an easy matter to cost patterns after the material record is available on the completed order. No copy of the order need be sent to the cost department in the first instance, but it is advisable to send lists of pattern order numbers issued each day so that cost records can be opened for the posting and verification of labour records which may become available before the actual order arrives at the factory office.

*Controlling pro-
duction in
originating de-
partments*

Similar methods of ordering and tracing can be used in dealing with the manufacture or preparation of raw material in the originating departments. In this case, however, production is closely allied to the scheduled production of the factory, as well as to any efficiency system that may be in operation. It is, therefore, necessary for the stores which issues orders for the preparation of raw material to carefully analyse schedules, and to maintain production as uniform as possible. The preparation of raw material will also entail some method of inspection and verification being in active operation, and efficiency can be very effectually controlled by the preparation of records which show all orders issued, and the proportions of efficient and inefficient work resulting.

That a certain proportion of such work must be faulty is inevitable in many classes of originating departments—the foundry, for instance—and if no effectual check is maintained on production, the averages of faulty work are likely to reach a prohibitive point, either through carelessness in

workmanship or the use of unsatisfactory material. When efficiency points are created through analysis of previous results, it is possible to watch closely the operation of the departments concerned, and to investigate and check promptly any tendency to lower the efficiency of the department or its productions.

CHAPTER VII

TIMEKEEPING, WAGES AND EFFICIENCY RECORDS

Time Recording by Hand and Machine : Bonus or Premium
Records : Wages Records : Wages Analyses : Efficiency
Records

*Time
recording*

LABOUR records, while in reality a vital part of the costing system of a business, are best treated as a separate department, linking with production on the one hand, and with costing and accounting on the other. The basis of all labour records must be the time record of work done, and any method of recording time must be adapted to the special requirements of the business. Only one method of time recording may be regarded as in any degree standard, and that is the recording of the time employees arrive at and leave the factory. Various methods of time recording by mechanical means have been invented for this purpose, each of which has its advantages and disadvantages, according to the conditions of the business in which it is used.

The principle in each case remains the same, and whether time is taken by a gatekeeper by hand, or is registered by a mechanical recorder, the result aimed at is to obtain the time each employee is in the factory. Greater accuracy is achieved by the use of mechanical recorders than by entrusting the work of recording time to an individual, and, except in very small businesses, it is advisable to eliminate the human element as far as possible in dealing with time, owing to the opportunities for error and dishonesty it creates.

Accuracy in costing demands accuracy in the distribution of time spent on each job. It is useless to leave the charging of time to the employee, as this gives him an opportunity of adjusting his entries to suit his own ideas of normal time on a job, without having regard for the actual time spent on it. Such methods destroy the whole value of a costing system, as they prevent any accurate record being obtained of time

saved on any operation which might again be saved in the future.

Lack of control is also a frequent incentive to dishonesty. In one factory where no efficient system of control was in force, it was found that certain workmen had been adjusting their time records so as to allow a safe margin on all premium jobs handled, any excess time being charged to their time-rate jobs; and while this could only be done occasionally, it had become a recognised practice among the men, and lost the firm many hundreds of pounds before being discovered, in addition to making the whole of their cost records worthless.

When time is recorded on sheets, it is a good plan to use a form which will enable a workman or the foreman to show the actual time a job was started and completed. In many factories a daily time sheet form is used, which indicates each quarter-hour during the day down one side of the sheet, so that the workman can draw a line across at the time a job is started, and another at the time it is finished, the intervening space being used for the entry of particulars of the work. This ensures a greater degree of accuracy, as a workman, however honest, may easily make an error of a quarter of an hour or more in recording time on a job if the whole record is left until the end of the day, or the week.

Non-mechanical time recording

Sheet time records should always be kept in a prominent place near the workman, so that they can be seen by the foreman or by any other workman who passes. This applies whether the sheets are daily or weekly, and any weekly sheets should always be collected and entered daily so as to prevent any revision of the entries. A simple method of dealing with time sheets that are used in this way is to use a numbered board for each, which can be hung in a prominent position near or on the workman's bench or machine. The boards can then be collected for entry of time records, and new sheets substituted by the time office, which can be written and numbered so as to prevent any exchange being effected. Sheets handled in this way are also kept clean, as the workmen do not require to handle them.

Where part production is carried on, operation time cards are the most suitable, that is, if means are provided for dealing with them accurately. Many firms avoid operation time cards solely on account of the expense of the necessary mechanical devices to make their use possible. This need not be any bar to the adoption of job or operation time records if a firm is really determined to use them. One big

TIME SHEET

Workman.....

Machine No.:

Department..... Time No...

Date..... 10

Order No.	Customer and Job	Job No.	Work Done	Time	M/c Time	Work Done	Machine No.
				7 45			
				8			
				2 15			
				8 30			
				8 45			
				9			
				9 15			
				9 30			
				9 45			
				10			
				10 15			
				10 30			
				10 45			
				11			
				11 15			
				11 30			
				11 45			
				12			
				12 15			
				12 30			
				12 45			
				1			
				1 15			
				1 30			
				1 45			
				2			
				2 15			
				2 30			
				2 45			
				3			
				3 15			
				3 30			
				3 45			
				4			
				4 15			
				4 30			
				4 45			
				5			
				5 15			
				5 30			
				5 45			
				6			
				6 15			
				6 30			
				6 45			
				7			
				7 15			
				7 30			
				7 45			
				8			
				8 15			
				8 30			

INSTRUCTIONS.—This time sheet must not be removed from its board, which must be kept hung in its proper place. If a time sheet is spoiled it must be handed to the foreman, who will issue a new one. Time must be recorded by drawing a line across at the time of commencement and completion of a job, and any waiting time must be separately recorded.

Foreman's
Sig.



Checked
by

FORM OF DAILY TIME-SHEET USED TO ENSURE ACCURACY IN ENTERING TIME AGAINST JOBS OR OPERATIONS.

TIMEKEEPING, 'WAGES, ETC., RECORDS 349

London printing house which has a great number of departments supplies each of its foremen with a cheap time and date stamp, costing about twenty-five shillings. These are set to the factory time each morning, and when a workman receives a job, a job time card is issued with it with the time stamped in the 'time started' space. Before the workman gets another job he has to return his previous job card, which is stamped with the time the job was finished.

Automatic recorders exist for such purposes as well, and *Mechanical time recording*

Order No. 4884		Customer J.W.C.	
Comp's No. 45		Job Book Binding	
BEGIN 	READER'S CORR. 	AUTHOR'S CORR.	CLEARING. <small>Value of Standard Form.</small>

SIMPLE FORM OF JOB CARD USED BY A LONDON PRINTING HOUSE.
TIME IS ENTERED BY MEANS OF AN INEXPENSIVE TIME STAMP

these not only record the time started on the job but also record the time that elapses between commencement and completion, thus saving the labour of calculating. These recorders, however, are not to be recommended for businesses where jobs run to any length of time, as their records are for the day only. Thus, if a man starts a job half an hour before closing time on Friday, and completes it during Monday, he will have made three separate card records for it, possibly for a total of only six hours in all. Even if he only takes an hour in all, so long as it runs into two days, it will mean two records. And as individual job cards mean, in any case, a multiplicity of records compared with other methods of time recording, it is advisable to take internal conditions into account before adopting any system of

THE BYGGEALL-BROOK TIME RECORDERS, LTD. FORM 222.

THIS SIDE OUT.

OPERATION	MARKED	NOT MARKED.
Blind		
Gold B & S		
.. B.		
.. S.		
Blind & Gold		
Ink & Gold		
Metal		
Foil		
Black		
Color		
Blend		

Name of Job

Actual No Done

Minutes allowed

Time

Piece

Taken

Saved

DAY	SECOND	DONE	SECOND	DONE	TOTAL
T	PM				
F	AM				
	PM				
S	AM				
	PM				
S	AM				
	PM				
M	AM				
	PM				
T	AM				
	PM				
W	AM				
	PM				
T	AM				

Total

BLOCKING JOB CARD.

JOB TIME CARD WHICH LASTS A WEEK AND IS USED FOR COSTING PURPOSES

mechanical recording that may add further to those records, and the clerical labour they involve.

When jobs vary in time, it is preferable to use a method of recording which will enable one card to be used for one job

pleted. In some cases it may be possible to take details only of any cards in use for wages purposes, leaving the actual cards to be completed in the usual way. If another workman is to finish the job, a 'supplementary' time card is issued, and premiums are then figured for each card record. But whether 'continuation' or 'supplementary' cards are issued, *all* wages and bonus calculations should be figured on the original card.

*Time
limits on
operations*

When time allowances are made, these should be clearly stated on the time card. The making of time allowances is the work of special employees of the wages department, and records may either be maintained by each foreman (being supplemented by special instructions for any new job) or can be kept in the factory office for recording on the job order. Circumstances must decide which course is preferable. Obviously, if no record of a time allowance is available in the department records or on the job order, the foreman must take steps to obtain one. This will entail an advice to the factory office before a job is due to commence, the time card being then issued without a time allowance. This is estimated either during the progress of work or by specially devised means, and is added to the time card while in use, a record being made at the same time for the indexes.

By means of the time limits fixed on each order, the time clerks can easily figure any bonus or efficiency allowances that are due to the workman. The time cards are then checked against the record of the workman's time in and out of the factory, and are finally passed on for costing and wages purposes. To enter daily details of every job in the wages records would merely tend to create a cumbersome record which would serve no useful purpose, and it is better and simpler to make a separate wages record for each man in single sheet form, which can then be posted to the wages book in totals.

*Wages
sheets*

Wages sheets of this kind can be prepared at the beginning of each week, and made up daily from the completed time records. By this means all a man's time against any particular job during the week is listed and totalled in his weekly wages sheet, with any extra payments due to him, totals across representing time on each order, and totals down the columns the total time for each day, which must correspond with the time record taken at the entrance to the factory.

Immediately wages sheets of this kind are made up, any

supplementary payments should be advised in some way to the employees, so as to avoid any dispute on wages day. It is a good practice to prepare slips giving details of additional earnings which can be handed to the employees in the evening, any disputes to be brought up the following morning if it is not wages day. When no margin is available

Man's No.		Week ending	
Name			
Time Card	Bonus Hours	Time Card	Bonus Hours
Verified		Total Hours	
Workman			

A SLIP GIVING DETAILS OF BONUS EARNINGS WHICH IS ISSUED TO THE WORKMAN FOR VERIFICATION BEFORE WAGES ARE MADE UP

between the day wages are made up and the day they are paid, the slips can be distributed during the day, and any complaints written on the back for attention by the wages clerk before wages are made up.

All wages paid should be closely dissected, and separate *wages analysis* records prepared for various purposes. It is useful to prepare the wages book with totals of each order and total earnings, from which any deductions are made, and the actual amount payable to each employee shown. This centres all information regarding wages in one volume. A useful analysis can also be made of wages paid on each order, giving the amount for the week and to date. This record should also show wages paid on account of all shop orders for repairs or equipment, &c., so as to cover all wages paid for direct labour. Wages and salaries on non-productive work can also be distributed over special columns so as

Work Done & Wages Paid, Week-ending Wednesday

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[illegible]

SUMMARY OF WAGES DISSECTION, Week ending Wednesday, --- 191

Page No.	Date	Time	Place	Subject	Remarks
1	10/10/1918	10:00	London	General	Received from Mr. Smith 10/10/1918
2	10/11/1918	11:00	London	General	Received from Mr. Smith 10/11/1918
3	10/12/1918	12:00	London	General	Received from Mr. Smith 10/12/1918
4	10/13/1918	13:00	London	General	Received from Mr. Smith 10/13/1918
5	10/14/1918	14:00	London	General	Received from Mr. Smith 10/14/1918
6	10/15/1918	15:00	London	General	Received from Mr. Smith 10/15/1918
7	10/16/1918	16:00	London	General	Received from Mr. Smith 10/16/1918
8	10/17/1918	17:00	London	General	Received from Mr. Smith 10/17/1918
9	10/18/1918	18:00	London	General	Received from Mr. Smith 10/18/1918
10	10/19/1918	19:00	London	General	Received from Mr. Smith 10/19/1918
11	10/20/1918	20:00	London	General	Received from Mr. Smith 10/20/1918
12	10/21/1918	21:00	London	General	Received from Mr. Smith 10/21/1918
13	10/22/1918	22:00	London	General	Received from Mr. Smith 10/22/1918
14	10/23/1918	23:00	London	General	Received from Mr. Smith 10/23/1918
15	10/24/1918	24:00	London	General	Received from Mr. Smith 10/24/1918
16	10/25/1918	25:00	London	General	Received from Mr. Smith 10/25/1918
17	10/26/1918	26:00	London	General	Received from Mr. Smith 10/26/1918
18	10/27/1918	27:00	London	General	Received from Mr. Smith 10/27/1918
19	10/28/1918	28:00	London	General	Received from Mr. Smith 10/28/1918
20	10/29/1918	29:00	London	General	Received from Mr. Smith 10/29/1918
21	10/30/1918	30:00	London	General	Received from Mr. Smith 10/30/1918
22	10/31/1918	31:00	London	General	Received from Mr. Smith 10/31/1918
23	11/1/1918	32:00	London	General	Received from Mr. Smith 11/1/1918
24	11/2/1918	33:00	London	General	Received from Mr. Smith 11/2/1918
25	11/3/1918	34:00	London	General	Received from Mr. Smith 11/3/1918
26	11/4/1918	35:00	London	General	Received from Mr. Smith 11/4/1918
27	11/5/1918	36:00	London	General	Received from Mr. Smith 11/5/1918
28	11/6/1918	37:00	London	General	Received from Mr. Smith 11/6/1918
29	11/7/1918	38:00	London	General	Received from Mr. Smith 11/7/1918
30	11/8/1918	39:00	London	General	Received from Mr. Smith 11/8/1918
31	11/9/1918	40:00	London	General	Received from Mr. Smith 11/9/1918
32	11/10/1918	41:00	London	General	Received from Mr. Smith 11/10/1918
33	11/11/1918	42:00	London	General	Received from Mr. Smith 11/11/1918
34	11/12/1918	43:00	London	General	Received from Mr. Smith 11/12/1918
35	11/13/1918	44:00	London	General	Received from Mr. Smith 11/13/1918
36	11/14/1918	45:00	London	General	Received from Mr. Smith 11/14/1918
37	11/15/1918	46:00	London	General	Received from Mr. Smith 11/15/1918
38	11/16/1918	47:00	London	General	Received from Mr. Smith 11/16/1918
39	11/17/1918	48:00	London	General	Received from Mr. Smith 11/17/1918
40	11/18/1918	49:00	London	General	Received from Mr. Smith 11/18/1918
41	11/19/1918	50:00	London	General	Received from Mr. Smith 11/19/1918
42	11/20/1918	51:00	London	General	Received from Mr. Smith 11/20/1918
43	11/21/1918	52:00	London	General	Received from Mr. Smith 11/21/1918
44	11/22/1918	53:00	London	General	Received from Mr. Smith 11/22/1918
45	11/23/1918	54:00	London	General	Received from Mr. Smith 11/23/1918
46	11/24/1918	55:00	London	General	Received from Mr. Smith 11/24/1918
47	11/25/1918	56:00	London	General	Received from Mr. Smith 11/25/1918
48	11/26/1918	57:00	London	General	Received from Mr. Smith 11/26/1918
49	11/27/1918	58:00	London	General	Received from Mr. Smith 11/27/1918
50	11/28/1918	59:00	London	General	Received from Mr. Smith 11/28/1918
51	11/29/1918	60:00	London	General	Received from Mr. Smith 11/29/1918
52	11/30/1918	61:00	London	General	Received from Mr. Smith 11/30/1918

USEFUL FORM OF WAGES BOOK WHICH CONCENTRATES ALL VITAL INFORMATION REGARDING WAGES IN A SINGLE VOLUME. THE RIGHT-HAND FORM IS A WAGES DISSECTION BOOK WHICH SHOWS COST OF LABOUR ON EACH JOB FOR THE WEEK AND TO DATE

TIMEKEEPING, WAGES, Etc., RECORDS 355

to provide a continuous analysis of all amounts disbursed for work done.

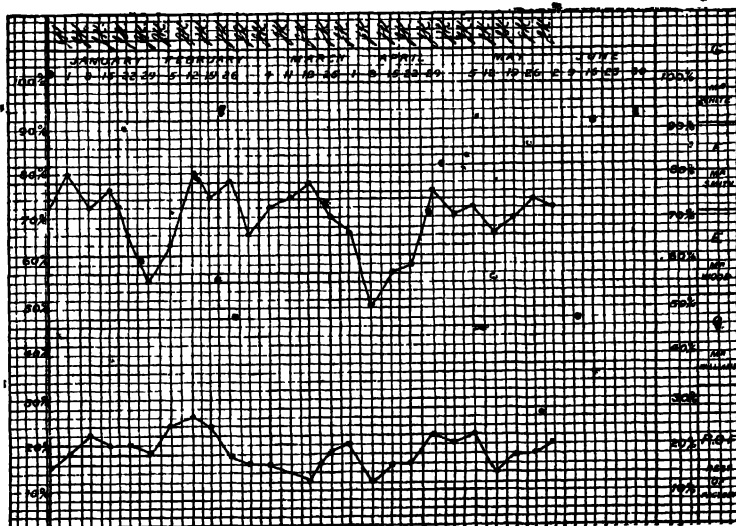
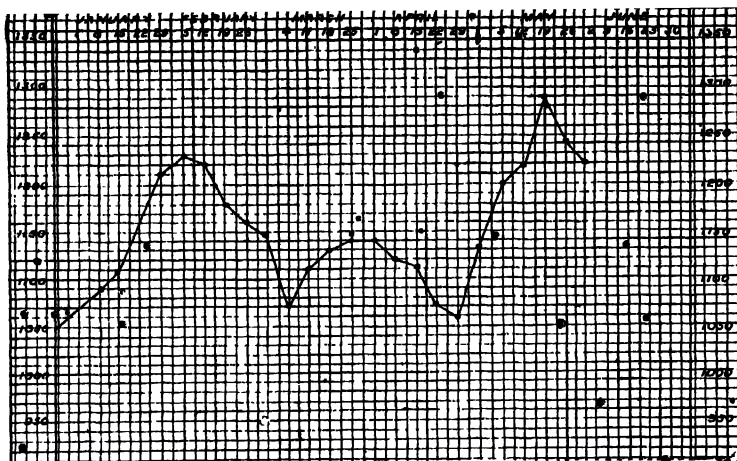
Another useful dissection of wages paid is a departmental analysis. This should be a comparative analysis which will show any weakness or fault which may be developing in the handling of the department. It should show the number of men employed; the relations between the productive and non-productive labour employed; average hours worked as a check on time, average wages rate, &c. These records should be supplemented by records of the jobs handled during the week, and the number and amounts of premium or efficiency payments. Such records can be seen by the foremen, who are thus able to keep an eye on the actual working of their departments. Foremen's signatures should be obtained to these records, which can then be kept for comparison by the factory office.

It is vitally necessary to plan any wages records or methods of analysis so as to fit the other departments of the business. The chief department concerned, is, of course, the cost department, and when wages paid are analysed they should follow the costing system in operation, so that any schedules on which the system may be based can be verified periodically from the current records, instead of special dissections of past records having to be made for costing purposes.

All wages or salaries should be submitted to analysis each week, whether concerned in direct production or not. A separate analysis can be made of the work of each distinct department which is not concerned in direct production, and which does not, as a consequence, come into the ordinary wages records. Such departments as the pattern department, drawing office, factory offices and stores, general offices and delivery department, can be treated in this way, so as to analyse and distribute the expense for reference purposes week by week.

Efficiency records, while they add a little to the clerical labour involved in the preparation of wages lists, need not result in any variation of the system suggested for the handling of ordinary premium payments; and in an ordinary business, which pays its employees their entire additional earnings, the preparation of efficiency wages sheets is simple. While there are many varieties of efficiency systems which can be operated, a general basis will be taken as an example, which will follow the system already described.

The basis of efficiency payments is the fact that not only



TWO FORMS OF CHARTS USED AS A CHECK ON WAGES

The upper form shows number of bonus jobs issued throughout a given department. In the lower chart, the upper line represents percentage of total wages paid in a department for a week that has been expended on bonus work, the remaining percentage being spent on daywork. The lower line represents average percentage of bonus earned by those men of the same department and during the same period, and it should be read in this way, that, of the wages received by any individual man during that particular week, so much per cent. of his money was bonus and the remainder ordinary daywork rate. At first glance this line appears rather low, but when it is remembered that it is the average for the whole department, it will be seen that in some instances a very good bonus must have been earned to keep the line where it is, covering the many debts that undoubtedly must have taken place.

a man's skill, but his general efficiency, affects his value to a business. He may save time on a job, but damage parts in doing so. On the other hand he may work only 75 per cent. of his available time, and thus keep a machine standing idle and eating up expense. Under premium methods, a man who wastes factory expense in this way is still entitled to his premium payment if he saves a little time on a subsequent job, in spite of the fact that he may actually have created a loss by his tardiness.

Efficiency margins should always be put fairly low, so that the ordinary workman has an opportunity of participating. For instance, normal point may be taken as 100 per cent., and workmen be entitled to participate if they show 75 per cent. efficiency or more. This interests men who would be incapable of benefiting from a high premium time limit, yet who are conscientious and painstaking workmen; and who can, through efficient workmanship and general all-round efficiency, add a little to their earnings.

Time cards, for efficiency purposes, should show the time taken as already explained, and the good parts received. They should also show the quality efficiency. A full quota of good parts would mean a 100 per cent. allowance. Less than a full quota would mean a proportionate allowance for good parts delivered, and a further deduction for value of waste parts. Any parts that can be put right are returned for further work, the time on which goes against the workman's time record, and is entered on a 'continuation' time card. Faulty parts that have to be replaced are charged against the quality record, percentages for such deductions being a question for individual conditions, and being affected according to whether the damage is caused by pure carelessness, or whether there is normally a certain percentage of such faulty parts in the business.

In addition to these, percentages can be allowed for *Record-* timekeeping, according to the time record for the week; *ing the* and in some businesses a further allowance may be made *efficiency* for general efficiency, based on foremen's reports of good *of the* conduct, and being affected by any reports of insubordination, *factor* carelessness, untidiness, &c. Special rates for deduction will need to be formulated for each business.

The result is that a bad workman who is quick at his work does not gain any advantage over a slower workman who is highly efficient in other ways. Thus a man may reach 150 per cent. efficiency by time-saving on his jobs, and yet be only 90 per cent. efficient on quality, 75 per cent. efficient

on time, and 85 per cent. efficient in character, making a total average efficiency of 100 per cent. Such a man would therefore have no advantage over a slower workman who was 100 per cent. efficient all round, and who would probably be of quite as great a value to the business.

Efficiency averages, calculated in this way, cannot be charged to jobs on the cards or on weekly wages sheets until a full week's records have been prepared, after which they can be shown in detail on a section of the sheet, and distributed as actual amounts over the various jobs. In some cases efficiency payments are made on labour times only, in the same way as ordinary premium payments, while in others they are based on labour efficiency averaged with a general efficiency basis made up from several sources.

Whatever system is adopted, it should be a recognised policy to maintain a permanent record of all efficiency averages. Apart from their value as a record of each man's value, such averages are of great service in preparing records of rates. In practice it will generally be found that a man who is an average of 100 per cent. efficient on labour will always remain at or about that point, so that if rates are scheduled which reduce him to 95 per cent. or increase him to 110 per cent. it is nearly always a certain proof that the schedules are wrong and need revision.

Under piece-work or premium methods a man has no aim but to reduce a time limit, and must, in consequence, know what the time limit is. Under efficiency methods he is working to gain a premium on all-round efficiency, which stimulates his energies at every point. It is then of importance to him not only that he should do his job efficiently, but that he should be on time, have no faulty work, and keep his machine or bench clean.

Records of individual efficiency

Records of individual efficiency, when properly kept, enable the total departmental efficiency to be easily obtained. On such total efficiency any extra payments to foremen and non-productive employees should be made. This brings every employee into the scheme, and makes for co-operation and indirect influence in promoting the general efficiency of the plant.

Each employee should have his own efficiency record, whether foreman or labourer, which should be taken into account in the general average and in any distribution of departmental bonuses. Total departmental efficiency can then be averaged to obtain total factory efficiency, and any

profit distribution to employees made on the basis of the annual efficiency of each department.

Departmental efficiency records have a stimulating effect on the entire business, as by publishing the records week by week or month by month as prepared, one department is set against another, and active competition to head the list is stimulated. Few businesses can follow the Carnegie principle of setting furnace against furnace, and basing the leadership on output; but every business can adapt the principle to ordinary manufacturing conditions by ascertaining individual and departmental efficiency on a percentage basis.

CHAPTER VIII

COSTING

The Elements of Cost : Material and Labour Costs : Expense :
The Distribution of Expenses : The Analysis of Current
Expense : Cost Analysis : Distinctions in Departmental
Operation Costs

WHILE there may be methods and systems that have a certain amount of applicability in more than one business, this does not apply to any system of costing adopted. Every cost system needs to be individual, and to be specially designed for each organisation. In preparing the present volume, the writer has had at his disposal the costing methods used by over one hundred and fifty businesses, scattered through two continents, yet in the multitude of forms and records, these systems cover, not a single one of any importance has been used in its complete form more than once. This fact, in itself, will indicate that costing problems are distinctly individual, and in the preparation of the present chapter no special system has been taken, the forms described being selected solely on account of their suitability to show the application of the basic principles of costing in dealing with manufactured products.

*Main
elements
of cost*

Cost of production resolves itself naturally into three main elements—material, labour, and expense. The analysis and distribution of labour costs have been dealt with in the chapter on Wages Systems, which left the records of labour cost totalled by the job in the wages analysis book. The charging of material cost will depend considerably on the store record methods employed. Some businesses find it advisable to list material cost on their store records, and to charge it direct on the material slips, particulars of which are then posted to the complete job order before it leaves the stores. In other cases, special cost records of material are maintained by the cost department, which figures its cost on the raw material slips that come through to it from the raw material stores.

That control over material cost details should in some way or other centre at the stores is important, as it is the stores that prepares the final material schedules. These schedules will include all classes of material—raw material, originating department material, manufactured parts and purchased parts—and if the classification of these is left to an outside department, difficulties are likely to accrue. Some firms use their material schedules as a cost basis for material. This leaves no measure of elasticity in handling a product, as a storekeeper may find that, unless he substitutes manufactured parts for parts scheduled for production, a serious delay will ensue, and if he is compelled to produce the parts owing to a cast-iron material cost schedule with which he cannot interfere, production is likely to suffer.

Only material actually issued on a job should be taken into account for costing purposes. This brings the basis of material cost down to the material slip or voucher which lists material actually received by the workman. If it is originating department material, the fact should be shown on the voucher, together with the order number under which the material has been produced. These slips should then pass the scrutiny of the finished material storekeeper before passing onward for costing purposes. The reason for this is that he can check the actual material issued against his material schedules, and by checking each slip against the schedule he effectually prevents any material being charged twice, as may happen if by accident a distinction between ordinary raw material and partly manufactured material had not been made on a slip.

Naturally all finished material issued for assembly comes from the finished material stores, so that there is no difficulty in checking the slips for such material against the schedule. In this case the slips may represent parts specially made for the job, in which case cost records will already be available, or they may represent parts purchased or taken from stock, in which case it will be necessary to indicate the order numbers or part cost record numbers, which will enable the cost department to ascertain the actual cost of the parts.

As job orders may still be in the factory while material and labour cost records are arriving at the cost office, it is necessary to provide means for recording cost as created, without waiting for the job to be completed. Generally this can be done best by the issue to the cost office of a copy of the job order, with production details omitted, and in their

*Material
costs*

*Cost office
material
records*

COST SHEET.

A.E.F. MOTORS.

Order No.

PART	Job No.	OPERATION	Check No.	WEIGHT G oz	Hours Work of	Rate per Week	E.C. Rate per hr	MATERIAL	LABOUR	E.C.	TOTAL
Stator		Turning and Filing									
Clamping Pieces		Cast iron Material									
Rings		Drill									
Plates		Turning									
Bolts		Cast iron Material									
		Filing									
		Material									
		Turning and Screwing									
		(H.S.) Material									
		Drilling									
		Welding									
		Material									
Rotor											
bolts & Clamping Piece		Turning and Filing									
Bolts		Material									
Pieces		Turning and Screwing									
		(H.S.) Material									
Shaft & Collars		Filing									
		Material									
		Turning									
		Material									

Total Cost	
Cost for One	

PORTION OF A FINAL COST SHEET TO WHICH DETAILS ARE POSTED FROM THE COMPLETE JOB ORDERS

*Getting
total cost
of pro-
duction*

Complete section cost sheets, when the sections are assembled, will give the section cost, and these records when assembled will give the total cost, so that links are provided down to the smallest detail of a product, which will enable cost to be traced.

*Analysis
of cost
details*

From each cost sheet, whether for a single minor part or for a section or machine, comparative cost records should be posted. These records should list the detailed cost of every job of the same kind that is dealt with in the factory. A part on one order may cost 3s. 6d. On the next order it may cost 3s. 9d., and on a subsequent order 3s. 2d. By listing the costs of each order for the same work consecutively, a comparative record is obtained which immediately shows any variation from normal cost. If the cost has increased, the reason can be discovered by comparison of the details with the details of previous cost, and the cause can then be remedied. If a cost has decreased, the reason can be ascertained in the same way, and steps taken to maintain the decrease, or improve on it, in the future.

A different material, or a change in workmen, will often result in decreased cost which only comparative records will bring to light. Notifications to the buying department, or the foreman of the department in which a man works, will then ensure the same conditions obtaining the next time an order is issued for the same class of work.

The great problem in costing is the distribution of expense. This is difficult even when a specific business is in question, and to treat the matter generally is practically impossible. Everything in expense distribution depends on the internal conditions of the business itself, and in a volume of this kind little can be done but to explain in some measure the principles on which such expense distribution should be based, and to indicate, as far as possible, examples of the application of the principle. The suggestions that follow may, therefore, go into greater detail than many businesses will need to consider, and may omit details of vital importance to others.

*Preparing
expense
schedules*

Primarily all expense should be scheduled, so as to provide a basis for distribution, and while schedules will vary in character, according to the class of business, a typical example of an expense schedule, planned for a small wood-working business, will be given so as to show the general application of the principle of distributing expense.

The first record to be prepared in arranging a schedule is that of building charges. This should cover all expense

directly connected with buildings and their maintenance, the latter including cost of lighting and heating. This annual building expense should then be distributed equitably over the departments, basing the distribution on space occupied and its comparative value, as well as on the value of buildings (if any) that are used by the department. This gives a building expense for each department.

Another division of expense which will require to be *indirect expense*

BUILDING COSTS

	£	s.	d.
Ground rent . . .	16	14	11
Interest on mortgages . . .	80	0	0
Leasehold policy . . .	11	0	0
Repairs	10	0	0
Gas and water	4	10	0
Rates and taxes	60	0	0
	£182	4	11

Distribution

	£	s.	d.
Mill 25 per cent.	45	11	3
Carpenters' shop 35	63	15	9
Machine shop 15	27	6	9
Ward 15	27	6	9
Power-house	9	2	3
Offices	9	2	3
100	£182	0	

THE BUILDING COSTS SCHEDULE, SHOWING METHOD OF DISTRIBUTION

distributed departmentally is that of indirect factory expense. Where no selling is included in the analysis of expense, this may be dealt with by distributing it over the total value of the product. In many cases it is merely a proportion of the cost of indirect supervision plus a proportion of the printing cost of the entire business, and as such is distributed departmentally so as to keep it distinct from selling cost. Such indirect expense, when distributed departmentally, may be distributed according to the number of productive employees, or productive hours worked in each department.

The present schedule, it should be understood, is merely a basic schedule, and does not therefore take into account any items of direct departmental expense which may occur

during the year. These items should always be charged direct to the departments concerned. The main items of expense for distribution having been arranged, it is necessary to take up the actual expenses of the various departments. Some of these will share in the distribution of general factory and building expense, and will themselves be finally distributed over other departments. Power is an instance of this. Power cost must cover every detail

<u>POWER COSTS</u>			
	£	s.	d.
Interest and depreciation on value of plant (£340) at 15 per cent.	51	1	6
Wages	78	0	0
Coal and oil	100	0	0
Water	15	10	0
Insurance	7	11	9
5 per cent. of building charges	9	2	3
" " general factory expense	5	9	0
	<hr/>		
	£206	10	6
<i>Distribution</i>			
Effected through the machine schedules.			

POWER COSTS SCHEDULE, SHOWING THE PROPORTIONATE CHARGES FROM OTHER SCHEDULES WHICH ARE CHARGED AGAINST POWER

that enters into the manufacture and distribution of power, and must include interest and depreciation on plant and equipment. In addition, power cost will take its proper share of the general factory expense, and of building and other general charges. The total will then need to be distributed equitably over the factory.

Distribution of power expense

The best method of distributing power expense is over the actual machinery which uses it. When possible it is advisable to closely measure power used departmentally as a check on waste. If no record of power used in this way is available, the departmental proportions should be estimated. If the machinery consists of a multitude of small machines which are operated on small parts, it will be found impracticable to distribute power cost over the machines individually, and in such cases it will become either a general departmental expense or a production unit expense. With few machines of a costly type, and which take long periods of time of the various jobs handled, it is better to charge

power by machines, and to distribute the departmental power expense equitably over the machines according to the power used, and the average periods the individual machines are in use.

For instance, a machine using one horse-power, and being operated continuously through each day, could not justifiably be charged with the same ratio of power expense as another machine which required five horse-power, and which was operated only occasionally. Power cost distributed by machines enables individual machine charges to be more equitably covered. Thus, under departmental methods of charging, a machine costing £1000 would bear the same expense ratio as one costing £50. With each machine bearing its own individual expense, this is not so.

Expense distributed by machines must include the following items, viz. :

- The machine's proportion of power charges.
- Interest and depreciation on its cost.
- Cost of its own special repairs and upkeep.

These, again, may be supplemented in some businesses, where departments are devoted solely to machinery, by another item which will include all the expense of the department. This is not always a good policy to follow, though there are instances where it may be carried out with safety. A more general method of distribution of machine department expense is to charge actual machine expense, as listed above, against the machine, and all other departmental expense against the productive labour of the department.

There are few machine departments where men are not employed sometimes on productive labour, in connection with their ordinary operations, which does not entail the operation of their machine, and this might then be operated on some other work. The distinction between machine and departmental expense is, therefore, a more equitable basis on which to work.

The distribution of expense of this kind over the product is generally on the basis of productive hours, whether of men or machines. This is not only the simplest but the most equitable basis for figuring costs. The average hours worked per annum per man are taken as a basis for obtaining the productive hours of a department, and are multiplied by the number of employees in the department. This total number of productive hours is then divided into the total *Method of distribution*

departmental expense, and a per hour expense rate is thus obtained, which is charged against each man's time on a job. The same method is followed in obtaining machine expense ratios, with the exception that in figuring machine

CARPENTERS' SHOP		£	s.	d.
Building charges	.	63	15	9
50 per cent. of foremen's labour	.	117	0	0
Supervision	.	54	0	0
Labourers	.	20	0	0
Extra machinery (int. and dep.)	.	7	10	0
Plant, &c.	.	15	4	0
Insurance	.	20	0	0
General factory expense	.	36	15	0
		<hr/>		
		£334	4	9
<i>Distribution</i>				
Full-wage men	.			22
Final-year apprentices	.			2
Two junior apprentices (50 per cent.)	.			1
Number of men				<hr/>
				25
Total productive hours worked during year	.			63,000
Expense rate per hour	.			1½d.
Amount produced by an expense rate of 1½d. per hour	.	£393	15s.	

EXAMPLE OF THE DISTRIBUTION OF DEPARTMENTAL EXPENSE

hours careful allowance must be made for the time different classes of machines are standing idle.

It may be possible, in some cases, to figure expense ratios more frequently than once a year, especially when the number of employees varies during certain seasons. If this is done, a close division must be made between permanent and occasional expense, so that the permanent expense schedule can be maintained for the year, and the occasional expense (such as certain classes of non-productive labour employed) can be obtained for each period for which the schedules are prepared.

Distribution of departmental expense

Only one example of departmental expense schedules is given, so as to show the method of totalling expense and obtaining the per hour rate. After the schedules are prepared, a definite expense basis must be made up for the use of the cost clerks, which will show exactly how expense is

to be charged. When expense is distributed by production centres as described in the first section of the present volume, each centre is numbered and this number must appear on the time record of each workman. Card records

GENERAL ANALYSIS OF COST SCHEDULES

The following table gives in condensed form the various charges to be made in order to cover the cost of a job through the various departments :

Carpenters' labour	Add 1½d. per hour
Apprentices' labour	" ½d. "
Mill machinists' labour	" 4d. "
Machine shop machinists' labour	" 3½d. "
Machine hours worked	See machine schedules
Yard expenses	Add 7 per cent. to material cost
Selling cost	" 10 per cent. to net cost of productive labour plus net cost of material
Material waste	See waste schedules

ANALYSIS OF COST SCHEDULES MADE UP TO SHOW HOW EXPENSE IS TO BE CHARGED

are then maintained of the cost ratio for each centre and cost is charged on the order from these.

Schedules, when complete, must total the estimated expense of the entire business for the year. Generally this total is based on the previous year's working, and should represent the difference between the total of all the year's expenditure plus capital charges and depreciation, less the value of productive labour and material used. Balance-sheets and profit and loss accounts should be disregarded in making up the necessary total for an expense schedule, and only this basis accepted. If the schedules cover this balance they may be regarded as safe, and costing can be carried out on them.

As an example of costing a small job under this method, *Example* the schedules already described have been used to prepare *of costing* the example given on page 372.

This will show how every detail of cost is taken into account, and a margin of profit assured. Costs prepared in this manner should be recorded in a special analysis book, which will give the details charged in separate columns. These can then be totalled for a period and

ANALYSIS OF PURCHASES

Date	Particulars	PURCHASED FROM	In Order No.	Amount Paid	DEBITED TO		Credit to	PARTS		PARTS		PARTS		PARTS		PARTS	
					General	Particulars		General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars
1																	
2																	

ANALYSIS OF SHOP EXPENSE

Date	PLANT & MACHINERY		MATERIALS		LABOUR		FUEL & POWER		REPAIRS		TRAVEL		ENTERTAINMENT		OFFICE		GENERAL		OTHER	
	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars
1																				
2																				

Date	PLANT & MACHINERY		MATERIALS		LABOUR		FUEL & POWER		REPAIRS		TRAVEL		ENTERTAINMENT		OFFICE		GENERAL		OTHER	
	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars	General	Particulars
1																				
2																				

ANALYSES OF PURCHASES AND EXPENSES, USED IN AN ENGINEERING BUSINESS.
 EVERY DETAIL OF EXPENDITURE IS COVERED BY THESE TWO FORMS
 (OF WHICH BOTH SIDES ARE SHOWN), WHICH PROVIDE A
 CONTINUOUS AND COMPARATIVE RECORD OF EXPENSE

ESTABLISHMENT & BUILDING CHARGES.

1	2	3	4	5	6	7	8
BUILDING REPAIRS: MASON, &c.	BUILDING REPAIRS: JOINERS, PLUMBERS, &c.	RATES & TAXES.	RENTS	INSURANCE.	WATER CHARGE BUTTS	WATER CHARGE HARER.	DONATIONS.

MOTIVE POWER, LIGHTING AND HEATING

1	2	3	4	5	6	7	8
REPAIRS: ENGINES, BOILERS &c.	REPAIRS SHAFTING, GEAVING, &c.	MACHINERY OIL, LUBRICANTS, &c	ELECTRICAL FITTINGS, LAMPS, REPAIRS, &c.	PACKING.	GAS ENGINE REPAIRS.	COKE HARER, HEATING.	GAS HARER, ENGINE.

DISTRIBUTION.

1	2	3	4	5	6	7	8
CARRIAGE OF GOODS	CARRIAGE OF RAW MATERIALS.	CARTAGE		PACKING PAPER.	CANVAS.	TWINE.	PACKING CLASP.

OFFICE AND WAREHOUSE EXPENSES.

1	2	3	4	5	6	7	8
STATIONERY.	ACCOUNT BOOKS, &c.	TELEPHONE AND TELEGRAPH CHARGES.	PATTERN BOOKS.	STAMPS.			

EXPENSE ANALYSIS FORMS USED TO CONTROL EVERY DETAIL OF EXPENSE IN A TEXTILE BUSINESS. ONLY PORTIONS OF THE FORMS (WHICH ARE KEPT IN LOOSE-LEAF BINDERS) ARE SHOWN

compared with the schedules, which can be revised if found inaccurate in any way. The schedules given, as well as the examples of expense distribution and the specimen cost, relate to a business which is not concerned in part production.

ORDER No. 3476.				JOB No. 2946				
<i>Labour</i>				<i>Expense</i>				
		<i>s.</i>	<i>d.</i>			<i>s.</i>	<i>d.</i>	
45.	7 hours at 9d.	5	3	7 hours at 11d.		10	1	
32.	3 " 5d.	1	3	3 " 11d.		4	1	
13.	6 " 2d.	1	0	6 " 3d.		4	1	
29.	4 " 10d.	3	4	4 " 4d.	1	4		
16.	2 " 10d.	1	8	2 " 3½d.		6	1	
		12	6			3	6	
<i>Machine cost</i>								
A1.	4 hours at 6d.					2	0	
B2.	2 " 2d.						4	
<i>Material</i>								
		£	<i>s.</i>	<i>d.</i>			<i>s.</i>	<i>d.</i>
Material cost		1	8	6	Waste		2	10½
					Yard		1	6
<i>Selling cost</i>							4	1
Labour					£	<i>s.</i>	<i>d.</i>	
Material						12	6	
Factory expense						1	8	6
						10	2½	
Production cost						2	11	2½
Selling cost							4	1
Total cost						2	15	3½
Profit							5	6½
Selling price						£3	0	10

Many details which apply to part production have already been given earlier in the chapter.

*Analysis
and
distribu-
tion of
current
expense*

An important part of the clerical section of a factory's organisation is the proper distribution of expenditures under their various heads. This distribution should be carried out on every payment made, however small. The method of distribution will depend on the costing system in force,

as the principle of making a continuous analysis of expenditure is to enable cost bases to be verified, and accurate records of departmental expense to be available for the preparation of cost schedules in the future. Such analyses enable a thorough control to be kept over every division of expense, and by the use of comparative records any increase or decrease in the normal expenditure under any particular head can be seen and investigated. •

Simplicity in dealing with such analyses is assured by coding each individual division and section of expenditure. All expense can first be sectionalised, and the various sections given a symbol. These sections can then be split up into their respective divisions, which can each be known by a number. If departments are also known by code letters, it is advisable to start each section of alphabetical code letters from different ends of the alphabet. This gives three classifications—individual, sectional, and departmental—and by using combined symbols every individual section can be indicated. Thus, if B is the machine department, Y the equipment division of expense, and 3 the number for manufactured equipment, a definite means of charging and distributing any expense for equipment manufactured in the factory is provided.

Composite figures of this kind will also indicate the ledger charge accounts, but it will rarely occur that these will go to such detail as to entail the use of all three references. More often they will be used solely for the main divisions of expense only, though in some instances they may be again split up into separate accounts for each individual section of the classifications, or for several items which can be charged together. This side of expense analysis will be dependent to a great extent on the ordinary accounting system of the business, and so far as the factory is concerned, the general analysis practically ends its responsibilities in this respect.

Methods of distributing expenditures as made are numerous, and no special example would serve for adoption by other businesses. The examples given on pages 370–371 are merely used to indicate methods adopted of making up analysis records to fit the special requirements of the business in which they are used.

The close division between manufacturing and selling *Manufacturing and selling expenses* cost enables the two departments to be treated as distinct businesses. This has to be the case, of course, where a factory is producing in one place, and a warehouse or a

[illegible]

Travis &
Casey, Inc.

History

MANUFACTURE

PATENT		O. C. CASES WANTS BE		APPL. GAS. & WATER		PLANT AND MACHINERY		SPECIAL TOOLS		SHIP FURNISH	
General	Electrical	General	Electrical	General	Electrical	General	Electrical	General	Electrical	General	Electrical
1. Name of Inventor	2. Name of Inventor	3. Name of Inventor	4. Name of Inventor	5. Name of Inventor	6. Name of Inventor	7. Name of Inventor	8. Name of Inventor	9. Name of Inventor	10. Name of Inventor	11. Name of Inventor	12. Name of Inventor
13. Address of Inventor	14. Address of Inventor	15. Address of Inventor	16. Address of Inventor	17. Address of Inventor	18. Address of Inventor	19. Address of Inventor	20. Address of Inventor	21. Address of Inventor	22. Address of Inventor	23. Address of Inventor	24. Address of Inventor
25. Title of Invention	26. Title of Invention	27. Title of Invention	28. Title of Invention	29. Title of Invention	30. Title of Invention	31. Title of Invention	32. Title of Invention	33. Title of Invention	34. Title of Invention	35. Title of Invention	36. Title of Invention
37. Date of Invention	38. Date of Invention	39. Date of Invention	40. Date of Invention	41. Date of Invention	42. Date of Invention	43. Date of Invention	44. Date of Invention	45. Date of Invention	46. Date of Invention	47. Date of Invention	48. Date of Invention
49. Name of Agent	50. Name of Agent	51. Name of Agent	52. Name of Agent	53. Name of Agent	54. Name of Agent	55. Name of Agent	56. Name of Agent	57. Name of Agent	58. Name of Agent	59. Name of Agent	60. Name of Agent
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73. Name of Firm	74. Name of Firm	75. Name of Firm	76. Name of Firm	77. Name of Firm	78. Name of Firm	79. Name of Firm	80. Name of Firm	81. Name of Firm	82. Name of Firm	83. Name of Firm	84. Name of Firm
85. Address of Firm	86. Address of Firm	87. Address of Firm	88. Address of Firm	89. Address of Firm	90. Address of Firm	91. Address of Firm	92. Address of Firm	93. Address of Firm	94. Address of Firm	95. Address of Firm	96. Address of Firm
97. Name of Firm	98. Name of Firm	99. Name of Firm	100. Name of Firm	101. Name of Firm	102. Name of Firm	103. Name of Firm	104. Name of Firm	105. Name of Firm	106. Name of Firm	107. Name of Firm	108. Name of Firm
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145. Name of Firm	146. Name of Firm	147. Name of Firm	148. Name of Firm	149. Name of Firm	150. Name of Firm	151. Name of Firm	152. Name of Firm	153. Name of Firm	154. Name of Firm	155. Name of Firm	156. Name of Firm
157. Address of Firm	158. Address of Firm	159. Address of Firm	160. Address of Firm	161. Address of Firm	162. Address of Firm	163. Address of Firm	164. Address of Firm	165. Address of Firm	166. Address of Firm	167. Address of Firm	168. Address of Firm
169. Name of Firm	170. Name of Firm	171. Name of Firm	172. Name of Firm	173. Name of Firm	174. Name of Firm	175. Name of Firm	176. Name of Firm	177. Name of Firm	178. Name of Firm	179. Name of Firm	180. Name of Firm
181. Address of Firm	182. Address of Firm	183. Address of Firm	184. Address of Firm	185. Address of Firm	186. Address of Firm	187. Address of Firm	188. Address of Firm	189. Address of Firm	190. Address of Firm	191. Address of Firm	192. Address of Firm
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217. Name of Firm	218. Name of Firm	219. Name of Firm	220. Name of Firm	221. Name of Firm	222. Name of Firm	223. Name of Firm	224. Name of Firm	225. Name of Firm	226. Name of Firm	227. Name of Firm	228. Name of Firm
229. Address of Firm	230. Address of Firm	231. Address of Firm	232. Address of Firm	233. Address of Firm	234. Address of Firm	235. Address of Firm	236. Address of Firm	237. Address of Firm	238. Address of Firm	239. Address of Firm	240. Address of Firm
241. Name of Firm	242. Name of Firm	243. Name of Firm	244. Name of Firm	245. Name of Firm	246. Name of Firm	247. Name of Firm	248. Name of Firm	249. Name of Firm	250. Name of Firm	251. Name of Firm	252. Name of Firm
253. Address of Firm	254. Address of Firm	255. Address of Firm	256. Address of Firm	257. Address of Firm	258. Address of Firm	259. Address of Firm	260. Address of Firm	261. Address of Firm	262. Address of Firm	263. Address of Firm	264. Address of Firm
265. Name of Firm	266. Name of Firm	267. Name of Firm	268. Name of Firm	269. Name of Firm	270. Name of Firm	271. Name of Firm	272. Name of Firm	273. Name of Firm	274. Name of Firm	275. Name of Firm	276. Name of Firm
277. Address of Firm	278. Address of Firm	279. Address of Firm	280. Address of Firm	281. Address of Firm	282. Address of Firm	283. Address of Firm	284. Address of Firm	285. Address of Firm	286. Address of Firm	287. Address of Firm	288. Address of Firm
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A CONTINUOUS BOOK RECORD, RUNNING ACROSS TWO PAGES, AND PROVIDING A COMPLETE AND DETAILED ANALYSIS OF EVERY PAYMENT MADE BY THE BUSINESS. THIS RECORD IS USED BY A BIG ENGINEERING FIRM

sales office is disposing of the product in another. But the practice needs to be followed generally so that the factory, as such, can be treated as a business which is absolutely separated from the selling department. A factory should make profits apart altogether from any profits made by the sales department. This need not be a large profit, and, as far as possible, profit margins should be allowed that will fairly equitably balance the entire profits made between the manufacturing and sales departments.

This method results in a greater measure of control being created over the profit margins resulting from sales. With the product charged against his department at a definite price, the sales executive cannot afford to cut his prices below a profit-making point, unless he is certain of balancing the loss in other ways. He is, therefore, compelled to use greater discretion in his selling than he would be inclined to do if he had the factory profit to fall back on as well. The factory executive, on the other hand, has something further to work for than a normal cost of production. He has a definite profit margin to make, and if he is in competition with the selling department his energies in this direction will be stimulated. Few men know, even when a loss on an order is apparent, whether it cost too much to make or too much to sell, or both. Unless causes are known they obviously cannot be removed. Businesses that show a loss on the year's working most frequently base their reasons on their small turnover, without realising that if on a small turnover they are making a loss on every order, a bigger turnover will be likely to increase the loss. If they are losing on some orders and making profits on others, the obvious remedy is to eliminate the losing business and to increase the profitable business. To do this, they must know which part of their business is losing and which is making profits—which again entails detailed analysis, that can only be made efficient through the operation of a good costing system.

CHAPTER IX

PRODUCTION CHARTS AND SCHEDULES

Planning Production Ahead : Production Charts : Advisory
and Basic Schedules : Material and Labour Schedules :
Departmental Schedules : Charts

THE planning of production by schedules is possible in businesses which manufacture similar classes of product all the time, but is rarely possible where the product is varying constantly. Production schedules are based on previous analyses of similar work done in the past, and for that reason the methods adopted of analysing costs and specifications will need to be based on the requirements of the schedules.

The primary and basic schedule is that of sales. This is the schedule on which all subsequent schedules are based, as it is on sales that production depends. Sales schedules should be prepared for each standard line manufactured, and as far as possible should show continuous sales over a long period. This is necessary, as the longer the period shown, the more apparent become any tendencies in the sales of a product to rise or fall, either progressively or periodically. From a record of this kind the estimated requirements of each product are based, and production of the product is then scheduled for a period.

How production is scheduled

When total production is scheduled, it requires to be done in two distinct ways. First, it should be scheduled as cumulative production, giving the totals due to date, day by day or week by week. Finally, it should be scheduled by periodical production. This latter is important because most products have periods in which demand is comparatively low, while others may be in more active demand at the same time. The relationship between each product to the total demand must therefore be taken into account when production is scheduled, so that uniform production can be maintained as far as possible, without allowing any product to suffer. This may entail the manufacture of stock of some products during certain seasons to meet the

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demand during seasons when the factory could not ordinarily maintain an output to meet it.

Production having been adjusted in this way, the schedules can be charted. Charts of this kind show the continuous relation between scheduled requirements and actual production, and are easier to read and understand than figures. All schedules, of course, are primarily made out as actual figures, and are handled in that way throughout the entire business; but for simplicity in watching results they should be charted as well.

Final basic schedules require several copies for distribution to the departments concerned. Material schedules will be prepared either by the drawing office or the stores, according to where the analysis of total basic material used on each product is kept. Labour schedules will be prepared by the cost office, and this department can also prepare any 'advisory' schedules that may be necessary.

Advisory schedules are records which are not directly *Advisory* concerned with actual production, but which have a direct *schedules* bearing on it. They are used by the executives in pre-determining future conditions. Examples of advisory schedules might be mentioned here, though their character will depend on the business in which they are used. An advisory schedule can be prepared to give the executives an idea of the minimum output necessary to ensure profitable operation, either in a department or in the entire factory. Thus, a department may be little concerned in the manufacture of some products, and if production is scheduled on a basis that will keep departments operating at the same rate on each product, some departments may at times be operating below their profit-making point. Knowledge of the output necessary to ensure profitable working is, therefore, vitally necessary when scheduling production.

Relations between other factory conditions and output can also be scheduled, so as to provide definite information on which the executives can base their plans. In some cases it is possible to schedule the maximum output of each department under normal labour conditions, so as to avoid scheduling departmental production in a way that will entail overtime at any period, and also so as to be able to watch closely the time when production is reaching the point where additional plant or buildings may be necessary.

Material schedules, when prepared, are used by the buying *Material* department and stores. They should be based on cumulative and periodical requirements, so that while contracts *and labour* *schedules*

can be made during favourable periods, deliveries or actual purchases can be arranged so as not to over-stock the factory or affect its finances.

Labour schedules are of two kinds. It is possible to schedule labour so as to show the approximate number of employees of every class necessary to carry out a schedule. This, when compared with actual production and the number of men actually employed, serves to keep a check on excessive labour expense. A schedule of this kind is also of enormous value when any special kind of labour is scarce, as it enables the factory to devote some time to ensuring its supply so as to avoid any shortage.

The second class of labour schedule is really a wages schedule, and shows the amounts necessary to provide wages, salaries, &c., to carry out the production schedules. This, taken in conjunction with material schedules and normal expense schedules, gives useful information on which to base the financial operation of the business.

*Departmental
schedules*

The schedules previously referred to are all basic production schedules. They, again, need to be supplemented by departmental schedules which will show the production of the main handling departments necessary to carry out the requirements of the main schedules. These departmental schedules do not affect every department in the business, but only such departments as the stores, assembly, and erection departments. Their preparation is worked downwards from the main erection or finishing schedule. This will create an assembly schedule for sections to be ready in time to carry out its requirements. The assembly schedule, again, will create a finished parts schedule, and this, again, a raw material schedule, on which the periodical section of the buying schedules will be based.

These part or section schedules can be handled in different ways. By charting production, a continuous visible record is provided which would serve as a combined part production and assembly schedule. In other cases, special production cards could be used, which would indicate the condition of every part in manufacture, and its relation to the schedule requirements. Only in special cases need such detail be taken account of, however, as in most cases it is simpler, and quite as efficacious, to schedule as far as main sections only, leaving the finished stores to adjust its production to meet the schedule requirements.

This brings up a point of great importance in planning production ahead. When production is scheduled for a

considerable period, it may tend to create a stock margin which may over-reach the bounds of safety. Scheduled production, of course, keeps control of details so efficiently that there is little danger of the actual stock becoming excessive so long as the product is maintained standard. The danger arises when the product is being improved, or occasionally altered in any way. With production scheduled for a long period ahead, such a change would entail a considerable amount of labour in revising records, and many standard parts in course of production might be made useless by the change. This does not affect the principles of scheduling output in any way, but affects the scheduling of details; and these should be planned only so far ahead as is commensurate with safety, so that any changes made will affect them as little as possible.

It occasionally happens that certain departments either cannot be scheduled by their production of certain parts, or do not require scheduling in that way owing to their dependence on departments which are so scheduled. In such cases it is advisable to schedule the departmental output as a total. This might be done in certain cases in dealing with a foundry, where the total output could be scheduled by weight, detailed schedules affecting individual products being planned for the raw material stores only. The use of production schedules and charts for estimating the future will necessitate the use of records which analyse the actual results; and all records of scheduled production should provide for the entry of figures or lines which show the relation between scheduled requirements and actual output, so that any serious difference can be inquired into and adjusted. No schedule, of course, can be standard, and safe margins must be allowed for the factory to operate on. For instance, it may take the factory several weeks to even approach the production scheduled on certain parts, while at another period it may overrun the schedule for a time. The use of schedules is not to create a dead-line of production, but to create a safe basis to which production can be kept approximately close, so that any excessive over- or under-production can be avoided.

The supplementary records and charts which analyse production as it proceeds will require special designing for each class of business; the illustrations provided in various chapters of the present volume are merely examples of charts in use which serve to control production details in different businesses.

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